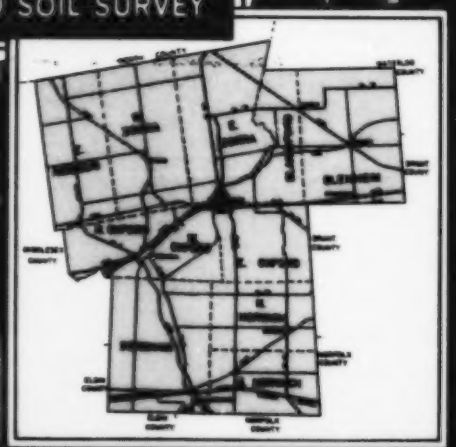
SOIL SURVEY OF OXFORD COUNTY

REPORT NO. 28
OF THE ONTARIO SOIL SURVEY



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Ministry of Agriculture and Food
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Agriculture Canada
Research Branch
Direction générale de la recherche

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THE SOIL SURVEY OF OXFORD COUNTY

by

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and

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GUELPH, ONTARIO
1961

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REPORT No. 28 OF THE ONTARIO SOIL SURVEY

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Fig. 1. Outline map of Ontario showing location of Oxford County.

THE SOIL SURVEY
of
OXFORD COUNTY

INTRODUCTION

The reconnaissance soil survey of Oxford County was conducted during 1953 and 1954. The soil map that was prepared, showing the extent and distribution of the various soils, accompanies this report.

The report presents data on the geology, the climate, the soil parent materials and drainage, and shows their influence upon the kind of soil development that has taken place, and indicates what effect these factors have on the types of farming which are being practised. A description of each soil series is given together with a discussion of its use for agricultural purposes. Such discussions on land use and management are necessarily general, since it is difficult to obtain basic information relating to crop yields and fertilizer practices that apply to specific soil types.

A section is included on the rating and suitability of the various soils that occur in the county for agricultural use. In the absence of crop yield information, the rating has been made chiefly on the basis of the physical and chemical characteristics of the soil.

The aim of the survey is to supply basic information about the soil, such as its location, origin, characteristics, present use and suggestions for its future use. Such information is embodied in the report and the soil map and should be of interest not only to farmers but to extension personnel and research workers.

GENERAL DESCRIPTION OF THE AREA

Location

Oxford County is located in Southwestern Ontario between 42° 30′ and 43° 30′ north latitude and 80° 30′ and 81° 15′ west longtitude. It is bounded on the north by Perth and Wellington Counties, on the east by Brant, on the south by Norfolk and Elgin and on the west by Middlesex. These counties together form much of the central heart of Southwestern Ontario and is surrounded by the Great Lakes system and specifically by lakes Ontario, Erie and Huron.

The total land area of Oxford County is approximately 765 square miles or 498,600 acres.

Geology, Bedrock

This portion of Ontario has been subjected to repeated glaciations and the bedrock is covered by a mantle of drift, consisting of boulder clay, sand, gravel and clay, which varies from a few feet to several hundred feet in thickness. The extent to which the bedrock has contributed to the composition of the soils overlying them is therefore difficult to assess. The individual bedrock formations cover rather extensive areas extending north to the Georgian Bay Region.

The peninsula that makes up the major part of what is referred to as Southwestern Ontario is underlain by marine sedimentary strata of Ordovician, Silurian and Devonian ages. Sediments belonging only to the latter two, are known to occur in the area occupied by Oxford County. These strata run diagonally across the eastern portion of the county boundary as indicated in Fig. 2. Much of the greater portion shown here consists of limestone but the dolomitic formations are equally as extensive in other county areas lying to the east and north.

The lowest member of the Silurian is the Salina formation, consisting of dolomite, limy shale and extensive beds of salt and gypsum, the whole ranging in thickness from 300 to more than 1400 feet. Beds of salt as much as 200 feet thick are known to exist. This formation is succeeded by the Bertie-Akron beds which are the uppermost Silurian strata in Ontario. They consist of brown dense dolomite varying in thickness from 35 feet in the Niagara peninsula to 395 feet in Essex County. Overlying these beds is the Norfolk formation consisting of grey limestone. Its thickness ranges from about 70 to more than 200 feet.

These bedrock strata are flat lying, and since the surface is everywhere covered with a mantle of glacial drift, bedrock exposures are limited to quarries such as occur in the vicinity of Ingersoll.

Surface deposits, soil parent materials

The surface geological deposits are discussed at this point since they make up the parent materials from which the soils of the area have developed. As indicated in the previous section, this portion of Ontario has been glaciated and a surface covering of soil materials of variable composition and texture has been deposited.

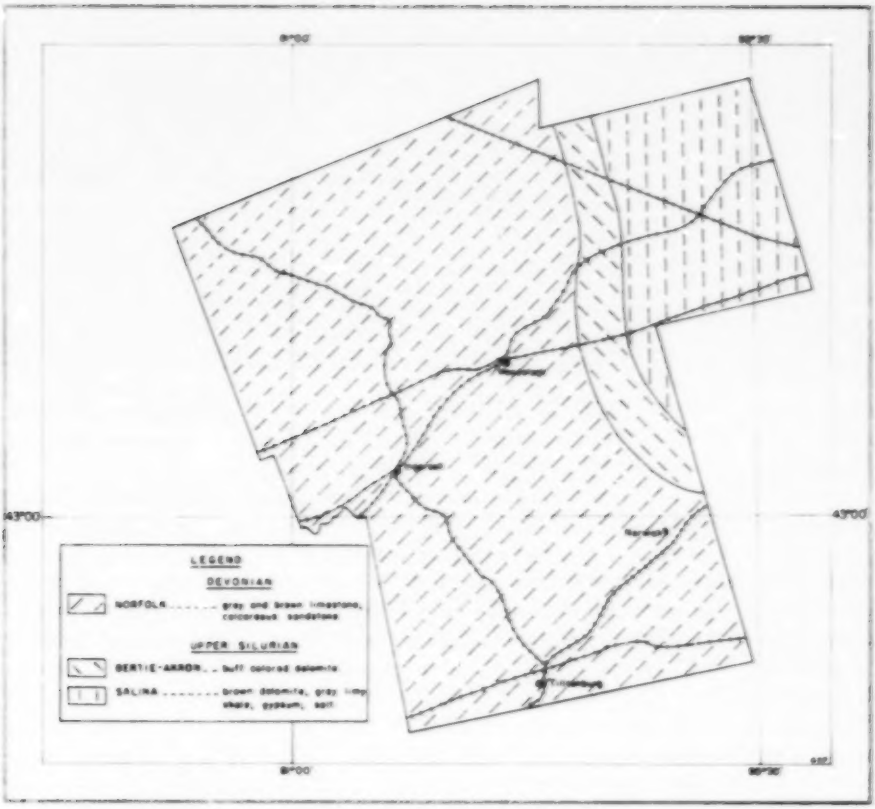


Fig. 2. Outline map of Oxford County showing Bedrock Geology.

These surface deposits are commonly referred to as till, outwash, kame and esker, lacustrine and deltaic, which denote the mode of origin and to some considerable extent the textural composition of the deposit. Glacial tills are the non-sorted materials and consist of a mixture of broken rock fragments and soil particles that range in size from clay to boulders. Since the underlying bedrock extending over the entire Ontario peninsula consists of beds of limestone and dolomite, these surficial deposits are therefore calcareous and particularly so with the till deposits. The high percentage of silt which is found in these surficial deposits would seem to indicate a high silt content in the original limestone bedrock.

Several textural classes of tills are present in Oxford County. Tills with a clay or a clay loam texture occur along the border of Perth County and rather extensively east and south of Woodstock in East Oxford, North Norwich and Dereham Townships. Tills with a loam or silt loam texture are interspersed with water laid sediments throughout the central portion of the county, particularly in North Oxford and West Oxford Townships.

The deposits designated as outwash consist of sands and gravels. Although isolated deposits of these materials may occur anywhere within the county the principal areas of deposition are in Blandford, Blenheim and South Norwich Townships. The sand deposits are by far the most common and occur in association with larger blocks of till materials or as relatively smooth sand plains. In many instances it would appear that these were the last of the surficial deposits to be laid down since they frequently overlie the till deposits in several smooth topographic sections of the county.

Other deposits that are somewhat similar to outwash in the nature of the materials are Kame and Esker deposits. Kames are considered to be deposits of stratified gravel, sand and silt that accumulated along the ice-front at the mouths of glacial streams. In the county these will be recognized as isolated gravelly hills that may be entirely surrounded by a uniform textured till. Esker deposits also consist of gravel in the form of long, narrow, rather winding ridges, broken by gaps and with tributaries that form a pattern similar to that of a stream. The crests of these ridges may be smooth but the sides are generally steep. Such a deposit occurs in the vicinity of Lakeside.

The term lacustrine, or lake laid, has been applied to fine textured sediments, occurring in many smooth level areas such as found in East Nissouri and West Zorra Townships. These probably represent areas of local ponding and of short duration since the depth of the deposits are thin and sorting of the materials is not well defined. In this region these silty deposits cover the smooth topographic areas and extend part way up the slopes of adjacent till ridges and hills.

Relief and Drainage

This region of Ontario has a varied relief and possesses the typical land form features associated with Continental glaciation. Elongated hills, known as drumlins, occupy much of the central part of the county, while the southern half consists of sand plains of deltaic origin interchanged with morainic ridges. The most continuously rugged relief is associated with the Waterloo Hills, near the

Moraine hills in Blenheim Township.

border of Waterloo and Brant Counties. This area which comprises the north half of Blenheim Township should perhaps be considered the wildlife preserve of Oxford County, since the relief and the complexity of the soil materials make much of this area unsuitable for agricultural enterprises.

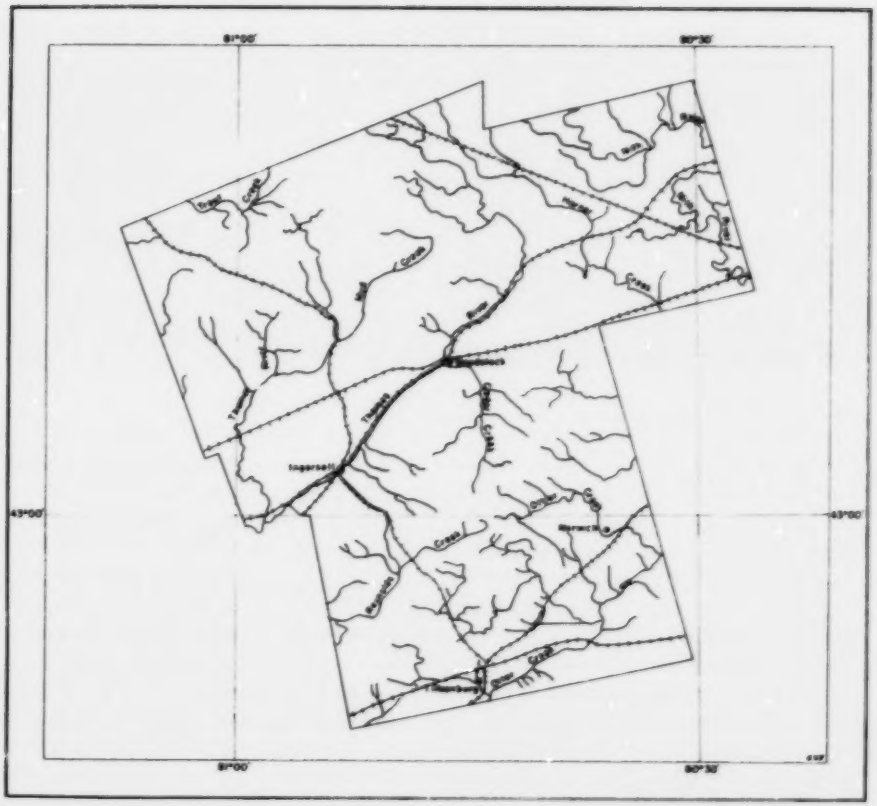
A broad area of rather smooth relief extends from Tavistock in the north, diagonally south west to Embro and Kintore. This is one of the best agricultural sections in this part of Ontario. Farm units consisting of 200 acres are common.

The central part of the county or that portion occupied by the southern half of the Townships East Nissouri, West Zorra, East Zorra, and most of West Oxford has a broadly rolling relief. This area also possesses excellent soils but has a great many large oval shaped hills. The type of agriculture practised here is not greatly different from that found on the area with more gentle relief to the north. Large farm units are common and the hills and sags between them are cultivated regardless of the steepness of slope.

The southern half of the county has a considerably different pattern of relief. There is a general absence of hills, the characteristics being rather, long and broad undulations in what might be considered a smooth plain. The overall elevation drops from 1050 feet above sea level in the vicinity of Salford to a low of 775 feet in the vicinity of Tillsonburg.

In this section of the report discussion of the drainage is confined to surface features only. Drainage as it applies to the internal part of the soil will be discussed in connection with each type of soil.

Some of the external drainage features within the county may be seen in Figure 3. The most prominent of these features is the Thames River. This river has two branches which run parallel across the central part of the county. The


81°00'
80°30'
43°00'
43°00'
81°00'
80°30'
Ingersoll
Thames
Otter
Creek
Creek
Creek

main branch rises in the bog area west of Tavistock, meanders south easterly through the gentle plain area of East Zorra Township, then continues into a deep glacial spillway that runs through Woodstock and Ingersoll. The north easterly part of the county is drained by Trout Creek, and its small tributaries, which flows north into the St. Marys river. The Waterloo sandhills area is drained by the Nith river, and its short tributaries, which flow south and east into the Grand River system.

There are no rivers in the southern half of the county. This section is drained by small intermittently flowing creeks that run in all directions but flow generally in a south and westerly direction. The Big Otter Creek that runs through Tillsonburg is the only one of any size and it drains the sandy soil areas in the south west corner of the county.

Although the rivers and creeks are effective drainage outlets for the excess precipitation that falls in this region, there are a great many undrained bogs and mineral soil depressions. The overall drainage system is immature and the county therefore possesses the features characteristic of recently glaciated areas.

Climate

Oxford County, being situated as it is in the peninsular region of south western Ontario, has a climate that is modified greatly by the Great Lakes. One of the most important aspects of climate in relation to agriculture is the length of the growing season and the interval between the last killing frost in the spring and the first in the autumn. The influence of the lakes shows up at temperature recording stations near lakes Huron, Erie and Ontario as listed in Table 1. At these stations the frost-free season ranges from 160 to over 180 days. With increasing distance from the lakes there is a corresponding increase in the variation of frost dates and generally a shorter frost-free season. (See Table 2.)

Another aspect of climate that is of importance to agricultural crops is precipitation. From the data shown in Table 1, it can be seen that this region has a fairly uniform pattern of distribution throughout the year. It has no marked wet or dry season. However, in the summer season the moisture requirements of growing plants often exceed that which is supplied through normal precipitation and mild droughts may occur, but generally there is dependability. In the winter months rain and snow may be expected, with snowfall contributing a much larger proportion of the moisture than rainfall. The accumulation of snow on the ground during and at the end of winter varies widely from year to year but is generally more prevalent in the rolling and hilly areas of the northern part of the county.

This region is traversed alternately by cool dry air from the north and warm humid air from the south and south west. Variations in the frequency of these air currents can produce in a summer month one of uncomfortably humid heat or an unseasonably cool month with too much cloud and rain. The latter produces a condition of slow growth of those crops such as wheat and corn that require high temperatures for maturity.

TABLE 1

CLIMATIC DATA

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Average Temperatures (°F.)													
Goderich	25	24	31	43	54	64	68	69	61	51	39	28	46
Guelph	21	20	29	42	53	63	68	66	59	48	36	25	44
Leamington	25	26	34	45	57	67	73	71	65	53	40	29	48
London	22	22	31	43	54	65	69	68	61	49	37	26	46
St. Thomas	24	24	32	43	55	64	69	68	61	50	38	27	46
Vineland	27	26	33	44	54	65	71	70	63	51	41	30	48
Average Precipitation (inches)													
Goderich	2.9	2.3	1.8	2.0	2.7	2.8	2.7	2.6	3.3	2.9	2.6	2.4	31.4
Guelph	2.8	2.0	2.5	2.6	3.0	3.0	3.5	2.9	3.0	2.3	2.7	2.2	32.9
Leamington	2.3	2.0	2.5	2.7	2.6	3.3	2.5	2.4	2.7	2.3	2.2	2.2	30.2
London	3.4	2.8	2.9	2.9	3.0	3.4	3.7	2.7	3.5	2.8	3.5	3.3	38.2
St. Thomas	2.9	2.5	2.7	3.2	3.1	2.8	3.3	2.9	3.0	2.9	3.2	2.7	35.7
Vineland	2.5	2.5	2.6	2.5	2.6	2.7	2.5	2.5	2.8	2.3	2.6	2.3	30.9

TABLE 2

FROST DATA

	Average Frost-Free Period (days)	Last Frost Spring (average)	First Frost Fall (average)
Goderich	165	May 6	Oct. 18
Guelph	135	May 17	Sept. 29
Leamington	177	April 30	Oct. 24
London	138	May 16	Oct. 1
Vineland	175	April 28	Oct. 20
Pt. Burwell	152	May 13	Oct. 12

Agricultural Development

The story of the agricultural development of Oxford County is but a repetition of that which is common to all sections of Ontario. The county gained its name of Oxford in 1798 when the old township of Oxford on the Thames, with other municipalities formerly belonging to the huge counties of Norfolk and York, was formed into a new county and made part of London district. The townships of Zorra and Nissouri were added in 1821.

A woodlot in south Oxford County. Vegetation is mixed hardwood and is used as source of fuel and lumber.

During the first half of the nineteenth century the population of Oxford County increased very rapidly, numbering over 32,500 by 1852. Of these nearly a third had been born in "the old country," a notable colony of Scots Highlanders having settled in the Township of Zorra.

The conditions under which the early pioneers struggled was a most difficult one and fifty or more years were to elapse before any real progress in methods or in the type of implements used in agricultural operations became evident. By the middle of the nineteenth century new breeds of cattle had been introduced and the establishment of Exhibitions or County Fairs added a strong impetus to the improvement of all phases of the agricultural industry. Around 1864, dairying became an established enterprise, following the erection of cheese factories at that time. Milk stands soon became a common sight on concession lines. This improvement in the agricultural prosperity had its effect on the living conditions of the pioneers and the log structures which constituted over ninety per cent of farm buildings as late as 1860 were replaced by large barns and storage buildings.

During the next twenty-five years the agricultural industry made great progress. Roads were built, bridges erected, brick residences built and reaping machines and mowers were introduced to harvest the crops. Winter wheat was introduced around the year 1860 and rapidly replaced spring wheat as the major agricultural crop. With the opening of the Canadian west, wheat growing became less profitable and the industry turned to dairying as a more remunerative enterprise. Dairying has maintained a leading role in the agriculture of the county up to the present day.

Shortly before the turn of the century some new crops were introduced and others were abandoned. According to the Agricultural Commission Report of 1881 the cultivated land in Oxford County had the following proportion of crops; fall wheat 10 per cent, spring wheat 4 per cent, barley 5 per cent, oats 15 per cent, peas 11 per cent, corn 3 per cent, hay 15 per cent, pasture 20 per cent and timber 17 per cent.

The fertilizers or soil amendments in use at that time were salt and land plaster, both of which were used on grain and root crops, and clovers and meadows. Plaster was applied in the proportion of 100 pounds per acre and salt from 50 to 200 pounds per acre.

The distribution of crops and the numbers of important kinds of livestock in the county at the present time is shown in Table 3. The percentages of the various field crops grown are expressed as percentages of the acreage in each township in an attempt to relate the incidence of crops to soils. In all townships, field crops constitute more than 50 per cent of the total acreage. The townships of Blenheim and East Nissouri have the lowest percentage of field crops since more of the land in these townships is rough and non arable than in the rest of the county. Wheat constitutes a small percentage of the land acreage and is grown in all townships. The townships of Blandford, Blenheim, East Oxford and East Zorra have a greater percentage devoted to this crop than any of the others. This crop is grown predominantly on the Guelph, Honeywood, Huron and Perth soils.

TABLE 3

DISTRIBUTION OF CROPS AND NUMBER OF LIVESTOCK BY SUBDIVISIONS (OXFORD COUNTY)*

Subdivisions	Acres	Acreage in Crops												Livestock			
		All Field Crops		Wheat		Oats		Mixed Grain		Hay		Corn Ensilage		Pasture		Cattle	Milk Cows	Pigs	Poultry
		Acres	(1) %	Acres	(1) %	Acres	(1) %	Acres	(1) %	Acres	(1) %	Acres	(1) %	Acres	(1) %				
Blandford	25,006	13,570	54	1,928	7.7	1,859	7.4	2,848	11.3	3,638	14.5	981	3.9	4,318	17.2	4,604	1,962	4,300	48,761
Blenheim	62,371	31,990	51	4,193	6.7	6,490	10.4	3,361	5.4	9,315	14.9	1,847	2.9	10,944	17.5	13,126	3,698	11,562	157,830
Dereham	63,089	37,469	59	2,203	3.5	8,414	13.3	2,087	3.3	12,506	19.8	2,833	4.5	12,621	20.0	14,896	7,299	11,186	169,860
Nissouri E.	46,582	23,610	51	900	1.9	4,662	10.0	4,791	10.3	8,246	17.7	1,481	3.2	14,254	30.5	12,268	5,359	6,944	107,006
Norwich N.	34,593	22,399	64	1,553	4.5	4,792	13.8	955	2.7	5,807	16.8	1,560	4.5	5,809	16.7	7,124	3,681	4,857	105,718
Norwich S.	33,902	20,445	60	1,830	5.4	1,797	5.3	53	.1	2,766	8.1	475	1.4	2,256	6.6	3,063	1,473	1,416	47,347
Oxford E.	32,383	20,379	63	2,034	6.3	4,891	15.1	1,882	5.8	6,843	21.1	1,745	5.4	6,674	20.6	7,061	3,757	5,308	77,995
Oxford N.	21,691	12,360	57	917	4.2	2,490	11.5	1,948	8.9	3,986	18.4	1,244	5.7	4,655	21.4	5,049	2,675	2,440	71,398
Oxford W.	23,898	14,864	62	890	3.7	3,981	16.6	1,310	5.5	4,910	20.5	1,429	5.9	5,008	20.9	6,015	3,349	4,493	64,591
Zorra E.	58,223	37,572	64	3,487	5.9	6,109	10.4	8,785	15.1	12,589	21.6	2,696	4.6	10,313	17.7	15,624	7,172	14,120	227,846
Zorra W.	52,271	27,430	52	1,566	2.9	5,790	11.0	5,309	10.1	10,006	19.1	2,009	3.8	14,623	27.9	13,112	5,965	6,836	124,287
Totals	454,009	262,088		21,501		51,275		33,329		80,612		18,300		91,475		101,942	46,390	73,462	1,202,639

*Data compiled from Census of Canada 1956. (1) Per cent of township acreage.

Oats and mixed grains together constitute from 16 to 25 per cent of the township acreages. The only exception is South Norwich which has only 5 per cent. This latter township has mostly sandy soils and they are used for tobacco. In the rest of the county the spring grains are grown in a crop rotation on all of the arable soils. The distribution of hay is very similar to oats and mixed grains since it is part of the same crop rotation. Again South Norwich has a much smaller percentage of its land given over to this crop.

The percentage of land devoted to corn is relatively uniform within each township. This crop is adaptable to any soil and its use as a crop is therefore associated more with the concentration of dairy cattle and other livestock.

Large areas in each township are also given over to pasture. On a percentage basis East Nissouri and West Zorra have more of their land in pasture than any of the other townships. From a soils standpoint, no explanation can be offered for such a distribution.

The distribution of livestock shows some striking differences. The townships having the greatest numbers of cattle are Blenheim, Dereham, East Nissouri, East Zorra and West Zorra. These counties also have the largest acreages of hay and pasture. To some extent this distribution can be associated with large areas of relatively smooth, imperfectly drained soils such as the Tavistock and Perth soils, although the Huron clay loam which has a slightly better drainage is also used extensively as hay and pasture land. Pigs and poultry are also concentrated in these same township areas.

The use of tile drains has been a long established practice in this county. The Agricultural Commission Report of 1881 states that in North Norwich the land was under drained with tile to the extent of 25 per cent and in East Oxford one-half of the cleared acreage was tile drained. It was reported that tile drainage was being installed in every township. This practice over the past century has initiated many changes in the soil and in its use for agricultural crops.

Transportation and Markets

It would be difficult to find a county in the province with a more complete network of highways, county roads and secondary roads. Local rural trade centres are therefore of little significance in the marketing and final disposal of agricultural produce. Transportation of produce either by truck or by rail is effective from any portion of the county and at any season of the year.

The principal cities and towns, which are marketing centres for some of the local produce, are Woodstock, Ingersoll and Tillsonburg. Woodstock and Ingersoll are centrally located within the county and are on the main highway routes. The city and town of London and Paris are within a short distance of the western and eastern county boundaries.

One of the largest tobacco centres in the province is the town of Tillsonburg. Although the principal areas of tobacco production lie outside the county boundary, processing plants and marketing facilities are located in Tillsonburg. This town is connected by rail and by highway with the American cities of Detroit and Buffalo.

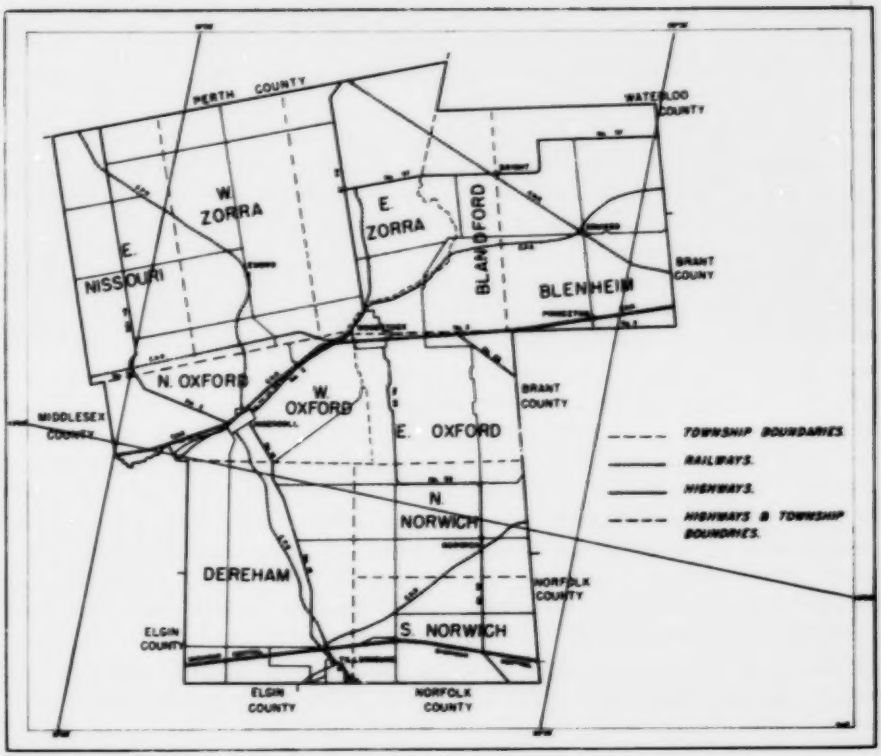


Fig. 4. Outline map of Oxford County showing township boundaries and transportation routes.

SOIL CLASSIFICATION

The surface deposits previously described are the parent materials from which the soils have developed, and as indicated they are in all cases calcareous or limy materials. Under the cool humid conditions present in this region, and with an original forest vegetation, the processes of soil development tend to produce acid soils. This acid condition is the result of the removal of bases, particularly calcium, from the surface layers of the soil by percolating water. This is referred to as leaching, and the effect produced on the soil is first the removal of lime followed by the development of layers or horizons that differ from one another in thickness, color and structure and frequently in texture.

A cut made through these horizons exposes what is known as the soil profile. The various combinations of horizons that are thus exposed are frequently referred to as surface soil, subsoil and parent material. However, since most soils have more than three horizons, further subdivisions are necessary. In soil descriptions these three divisions are labelled A horizon, B horizon and C horizon and are further designated as A_1, A_2, B_1, B_2, C, etc. for more detailed and accurate descriptions where the main soil horizons are subdivided. These terms are used for the detailed soil descriptions given under each soil series.

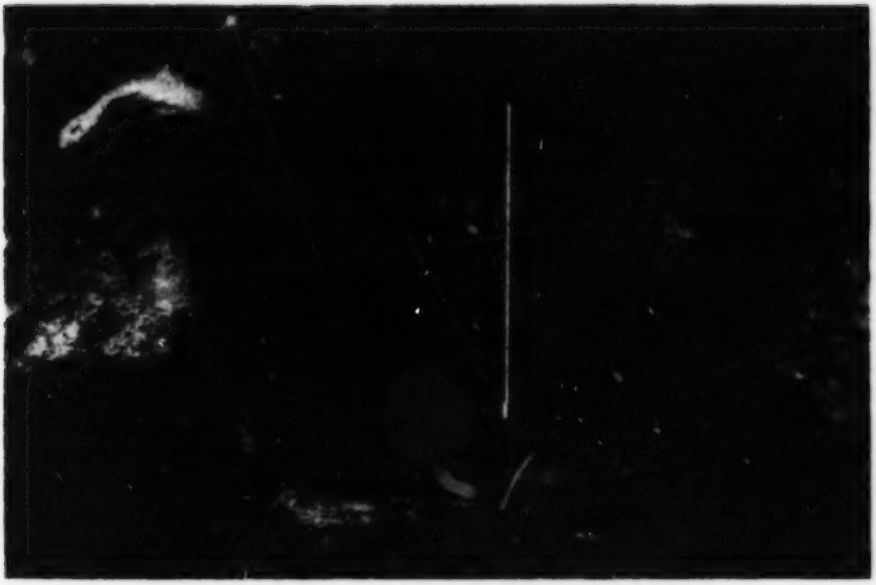
The A horizon is the horizon where maximum leaching takes place and from which the bases are removed by the downward movement of water. In many soils the A horizon can be subdivided into A_1 and A_2. The A_1 horizon contains the largest amounts of organic matter and the A_2 is the horizon with the lightest color, and frequently has a bleached appearance. Some of the materials leached from the A_2 accumulate in the B horizon, and in this region of the province these accumulated compounds may be either organic materials or inorganic material such as clay, or both. The result is that often the finest texture in the soil is located in the B horizon. The C horizon or what is more generally referred to as parent material, may be altered or only slightly altered by the soil forming processes.

Poorly drained soils or those in which ground water is present for a large part of the year, have a condition designated as "gley". The gleyed horizon is recognized chiefly by color, being dark grey or grey with a concentration of yellow and red colors forming a mottled appearance.

It is on the basis of the development of these horizons that the soils of a region are classified.

Great Groups

One of the most important units in soil classification is the Great Group. This unit contains a great many different types of soils, or soils that vary in texture and in drainage, but have other characteristics in common such as those that have been produced by processes of soil development. The following descriptions give the characteristics of the soils representing the Great Groups occurring in this county.



A Grey-Brown Podzolic Soil Profile.

GREY-BROWN PODZOLIC SOILS

The development that leads to Grey-Brown Podzolic soils is well expressed in Oxford County and occurs on all soils with the exception of those having poor drainage.

The horizons that are normally present in the profiles of the Grey-Brown Podzolic soils are: A_h (A_1), a black or dark grey surface horizon, 4 inches thick, with an organic matter content ranging from 5 to 12 per cent, neutral in reaction; A_{21} (A_{e1}) a brown or yellowish brown horizon, 8 inches thick, slightly acid in reaction; A_{22} (A_{e2}) a light brown or brownish grey horizon, 12 inches thick, acid in reaction; B_2 (B_t) a dark brown horizon consisting of a concentration of clay. This horizon varies in texture and in thickness according to the texture of the soil parent material. The clay content is generally more than two per cent higher than the horizons above or below in coarse textured soils, and more than five per cent in the medium and fine textured soils. Almost without exception the B_t horizon lies directly in contact with the calcareous parent material.

DARK GREY GLEYSOLIC SOILS

The Dark Grey Gleysolic soils are the poorly drained soils occurring within this region. Under these conditions the soils develop characteristics that are considerably different from that which takes place in the soils that have good drainage. The presence of a high water table during most of the year produces

A Dark Grey Gleysolic Soil Profile.

a rank growth of vegetation from which the high organic content of these soils is derived. The chemical reactions within the soil are such as to produce blotches of brown, rusty and dull colors. The lime originally present in the parent material is frequently leached out to a considerable depth.

The profiles of these soils have the following horizons: A_h (A_1), a black surface horizon with a high content of organic matter, 4 to 6 inches thick, neutral in reaction; G_1 (Amg_1) a dark grey horizon, strongly mottled, may be neutral or slightly acid in reaction; G_2 (Amg_2) a light grey horizon, strongly mottled, may or may not be present. When it is present and leached free of carbonates, it shows no further horizon differentiation and may be from 12 inches to 24 inches in thickness. The calcareous parent material occurs directly below.

Series, Types, Phases and Complexes

The units by which soils are mapped and described are designated as series, types and phases. The principal mapping unit is the series which in turn may consist of two or more types or phases. The criteria that characterize the series are determined from an examination of the profile and the soils included in this unit are relatively uniform in their development. The soil type is a subdivision of the soil series, based on the texture of the surface soil. The full name of the soil type is a combination of the series name and the surface texture, for example, Tavistock silt loam. Phases are usually subdivisions of soil types and are based on external characteristics of the soil. These separations are introduced to show differences in slope, degree of erosion or content of surface stone from that which is common on a given soil type.

Soil complexes appear in this survey as a mapping unit, but are in reality a combination of two or more soil types. This system of mapping is used where two or more soil types occur in such an intricate pattern that they cannot be separated. Therefore, in naming each complex, the names of both soil types are used. The characteristics of each type are the same as in the areas where they occur alone.

SOIL KEY

	Acreage
A. Soils Developed on Glacial Till	
I. Calcareous loam parent material.	
(a) Good drainage	
1. Guelph loam (Gl)	70,900
2. Guelph silt loam (Gsil)	2,400
(b) Imperfect drainage	
1. London loam (Lol)	11,800
2. London silt loam (Losil)	1,200
(c) Poor drainage	
1. Parkhill loam (Pal)	3,200
2. Parkhill silt loam (Pasil)	400
II. Calcareous, clay and clay loam parent material.	
(a) Good drainage	
1. Huron clay loam (Hucl)	57,000
2. Huron silt loam (Husil)	20,600
(b) Imperfect drainage	
1. Perth clay loam (Pcl)	24,500
2. Perth silt loam (Psil)	36,600
(c) Poor drainage	
1. Brookston clay loam (Bcl)	2,200
2. Brookston silt loam (Bsil)	500
B. Soils Developed on Silty Deposits (till and alluvial deposits over till).	
I. Silt loam overlying calcareous loam till.	
(a) Good drainage	
1. Honeywood silt loam (Hosil)	22,600
(b) Imperfect drainage	
1. Embro silt loam (Emsil)	33,700
(c) Poor drainage	
1. Crombie silt loam (Crsil)	5,500
II. Silt loam overlying calcareous clay and clay loam till.	
(a) Good drainage	
1. Bennington silt loam (Bnsil)	8,300
(b) Imperfect drainage	
1. Tavistock silt loam (Tasil)	27,900
(c) Poor drainage	
1. Maplewood silt loam (Mwsil)	2,700

C. Soils Developed on Outwash and Deltaic Deposits

	Acreage
I. Calcareous medium and fine sand parent material.	
(a) Good drainage	
1. Fox loamy sand (Fxls)	40,400
2. Fox sandy loam (Fxsl)	4,500
3. Fox fine sandy loam (Fxfsl)	900
4. Fox loamy sand, rolling phase (Fxls-r)	2,200
5. Fox sandy loam, rolling phase (Fxsl-r)	9,300
(b) Imperfect drainage	
1. Brady loamy sand (Byls)	3,700
2. Brady sandy loam (Bysl)	6,000
(c) Poor drainage	
1. Granby sandy loam (Grsl)	5,500
II. Sand overlying calcareous clay and clay loam till.	
(a) Good drainage	
1. Bookton sandy loam (Bosl)	3,100
(b) Imperfect drainage	
1. Berrien sandy loam (Besl)	2,400
(c) Poor drainage	
1. Wauseon sandy loam (Wasl)	300
III. Loam and sandy loam material overlying coarse gravel.	
(a) Good drainage	
1. Burford loam (Bul)	1,100
2. Burford sandy loam (Busl)	15,100
(b) Imperfect drainage	
1. Brisbane sandy loam (Bxsl)	2,300
(c) Poor drainage	
1. Gilford sandy loam (Gisl)	700
IV. Calcareous coarse gravel and cobblestone.	
(a) Good drainage	
1. Donnybrook sandy loam (Dosl)	2,300

D. Soils Developed on Recent Alluvial Deposits

1. Loam, sandy loam and silt loam material.	
(a) Variable drainage	
1. Bottom land (B.L.)	11,500

E. Soils Developed on Organic Deposits

1. Muck (M)	12,600

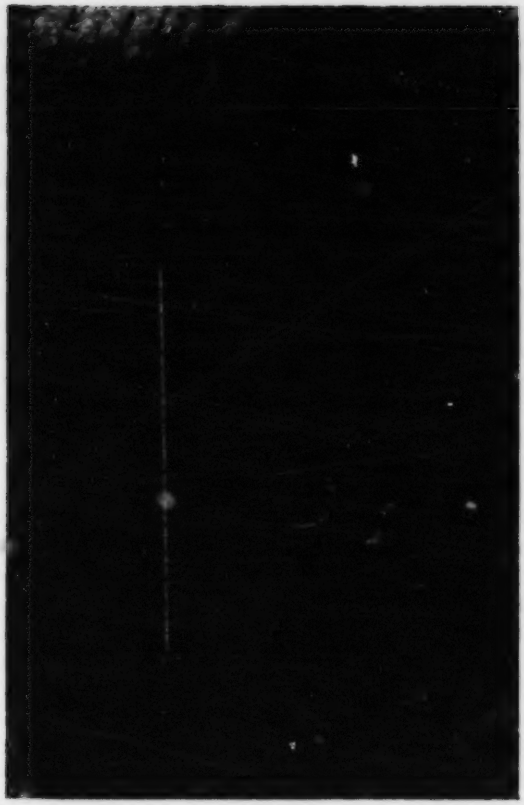
F. Soil Complexes

1. Honeywood-Guelph (Hosil-Gl)	33,700

GUELPH SERIES

The Guelph soils that occur in Oxford County are so named because they are similar to the soils that compose the rolling lands west and south of Guelph, the latter having been named Guelph in previous soil surveys. These soils occupy the rolling or moderately steeply sloping hills or drumlins north and south of Woodstock, with smaller isolated areas in Blenheim and North Norwich Townships.

The soil parent material is a glacial till that has been derived from the soft brown colored limestones that form the underlying rock strata. The texture is predominantly loam but is frequently intermingled with hill areas consisting of silt loam. Silt loam soils may therefore be expected to occur anywhere within the main body of Guelph soils. Where this silt loam texture is confined to the surface it has been designated as Guelph silt loam. South of the Thames river, silt loam becomes the dominant material and this area has been classified as the Honeywood-Guelph Complex.



Soil profile of the Guelph loam, a typical Grey Brown Podzolic soil.

These are among the best agricultural soils in Southern Ontario. Soil development reaches its maximum expression in loam and silt loam textures and these soils may therefore be considered as the modal example of Grey-Brown Podzolic soils. Since there are very few field stones or boulders the only handicap to cultivation is the frequency and steepness of the slopes. They are well drained in regard to both surface and internal drainage but are capable of retaining adequate amounts of moisture for the needs of agricultural crops in normal seasons.

On smooth upland locations, where surface erosion has not taken place, the surface soil is dark grey in color and moderately high in organic matter content. The depth of the soil to the unaltered parent material is approximately twenty-four inches, a depth that is adequate for the development of plant roots. On the slopes of the hills, water erosion has often removed most of the dark surface soil and deposited it further down the slope or in the sags between the hills.

The Guelph soils, in this area, have been cultivated since the early days of settlement. From the standpoint of soil conservation the establishment of dairying as the major agricultural enterprise, in contrast with wheat production, was a

fortunate development, since it introduced hay and pasture crops into the rotation. This has continued up to the present day. Some winter wheat is grown but the major crops are hay and oats. Grain and silage corn is also produced and records (1) indicate that the Guelph soils are as suitable for this crop as any soils in the county. Tomatoes are grown commercially, the acreage allotted to this crop varying probably from two to five acres per farm. The suitable texture and ease of cultivation of these soils should be an incentive to further expansion in acreage for these vegetable crops.

The surface and subsurface soil is neutral in reaction, the subsoil becoming progressively more alkaline with depth until free carbonates occur at a depth of 24 inches. The soil contains a plentiful reserve of essential plant food elements but the amount available is often insufficient for a rapidly growing crop. This immediate requirement for more plant food must then be supplied by application of commercial fertilizers. The general recommendations given by the Advisory Fertilizer Board for a specific crop may be all the treatment that is required.

LONDON SERIES

The London soils are important agricultural soils in Oxford County, and examination of the soil map will show that they occur in association with the Guelph series. These are imperfectly drained soils and occur on level upland areas where surface run-off is slow and where internal drainage is also slow. The origin and the material from which these soils have been derived is the same as that of the Guelph series and they therefore have the same potential in agricultural production.

The influence of imperfect drainage can be seen in the subsoil horizons. Where soils remain saturated for a portion of the year, mottles or blotches of yellow and orange colors appear in the soil material. This mottled appearance occurs directly below the surface 6 inch horizon, indicating that the water table level remains fairly high during various seasons of the year. The water table level drops during the spring and summer and its only effect upon the agricultural use of the soil is in delaying seeding operations in the spring.

These soils differ from the Guelph soils in some other respects. The dark colored surface horizon is commonly one or two inches thicker than that of the Guelph soils and one or two per cent higher in organic matter content. The average organic matter content for cultivated surface soils is over 5 per cent. These soils can be expected to give crop yields equivalent to that obtained on the Guelph soils, and may possibly be more productive in seasons of low rainfall. These soils are ideally suited for crops that are grown for livestock feed whether it be used for dairy or beef breeds.

The cultivated soils possess a dark grey to black surface. This plowed layer is generally six inches in thickness. This is underlain by a brownish grey subsoil, eight to ten inches in thickness, becoming light grey in color during the dry season of the year. Below this subsoil layer is a dark brown layer containing an accumulation of clay that is present in soils of all textures. Thus if the layer above is loam, this accumulation layer will probably be clay loam. High lime

(1) Grain corn in Oxford County. Farm Economics Branch.

loam textured parent material occurs directly below this clay loam layer.

These soils, in common with nearly all loam textured soils, have a friable surface and are therefore easily cultivated.

PARKHILL SERIES

The Parkhill soils occupy small irregularly shaped locations within the area occupied by the Guelph and London soil series. These are poorly drained depressions that act as catch basins for excess run-off water from the surrounding slopes. In many places, small streams have developed at the foot of the slope and the storage of water is then only temporary. All of the Parkhill soil areas drain completely at some time of the year, which is generally late in the summer.

The soils in these locations have characteristics that are greatly different from the soils occurring on the slopes, where the drainage is much better. The most obvious is the much darker color of the surface soil. This color is the result of organic matter accumulation. In this region the leaves and stems of plants decay very slowly in these poorly drained areas and black muck like surfaces are therefore formed. Some of the dark surface is also the result of the accumulation of eroded surface soil carried down the slope by running water.

The dark surface soil may be six or eight inches in thickness. In addition to being high in organic matter content it has a soft granular structure and is generally neutral in reaction.

Below this surface layer are usually two grey layers that differ from each other in intensity of color. The upper layer has a thickness of ten inches and is usually light grey in color with a profuse amount of yellow mottles. The lower layer is dark grey in color and also is strongly mottled. The reaction of these layers varies with the fluctuation of the water table or the completeness of drainage during the summer months. If the water table drops two or more feet the soils are nearly neutral in reaction. When the water table remains within the surface two feet of soil, the reaction is alkaline and free carbonates are present.

These areas of poorly drained soils are frequently a source of annoyance to a farmer since they interfere with normal cultivation. Some method of surface or tile draining is carried out to remove the surface water. Although this procedure does bring these areas into the field of normal cultivation, they are never as productive nor as reliable as the better drained soils. Special treatment with nitrogen carrying fertilizers can be used to advantage for producing active growth of crops that are seeded in the spring and early summer.

HURON SERIES

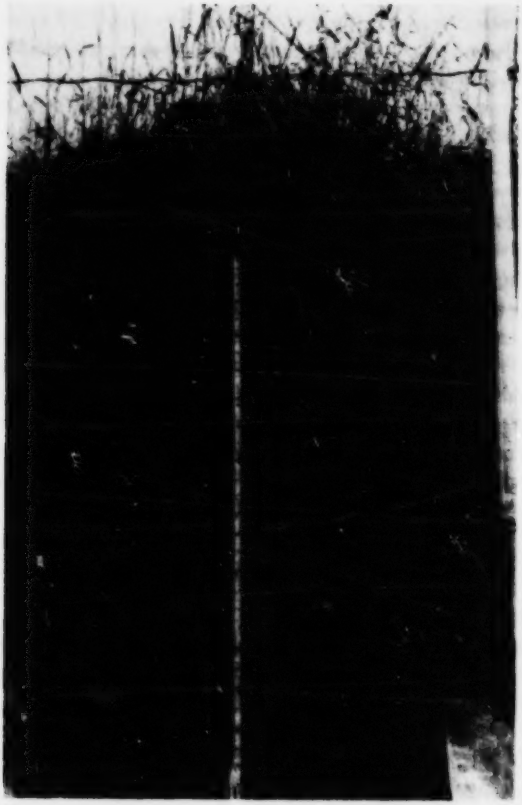
The Huron soils are normal Grey-Brown Podzolic soils having profile features that are very similar to the Guelph soils. These soils are developed from clay and clay loam textured till and therefore the texture of the entire profile is finer than in most soils in the county.

The occurrence of these soils is quite irregular but the largest continuous block is found in the southern half of the county. They occupy the rolling and sometimes hilly landscape in East Oxford Township, the northern portion of North Norwich and Dereham Townships. From a physiographic point of view

they represent a succession of moraines that run roughly parallel to each other across the lower part of the county. In East Oxford the slopes of the hills are often quite steep. In Dereham the topography is more frequently in the form of long ridges with long gradual slopes.

Some isolated small areas of Huron soils are shown on the soil map in Blenheim Township and in the northern portion of East and West Zorra Townships. These soils are somewhat coarser in texture than the Huron soils in the lower half of the county. In these areas the surface texture may be clay loam or silt loam, the subsoil is clay loam but the parent material is either loam or silt loam. These are also morainic areas with many steep slopes.

There is very little uncleared or unimproved land where these soils occur. Hay and cereal grains are the principal crops grown and for this purpose the Huron soils rank among the best in the county. The surface texture is frequently silt loam as well as clay loam and many of them therefore have the same ease of cultivation as the Guelph soils. Dairy farming is prevalent in these areas and the result is that hay and pasture grasses constitute a large part of the farm acreage. The cereal grains are winter wheat, oats and corn, the latter also being used for ensilage.



Huron clay loam soil profile.

The feature that characterizes these soils in contrast with soils developed from tills of other textures, is the structure of the subsoil layer, or the B horizon. This horizon has a regular blocky structure, the individual peds or aggregates varying in size from one to two inches in diameter. This structure persists under various moisture contents and is therefore present in all seasons of the year. It aids the internal drainage of the soil and probably accounts for the well drained appearance of this soil in spite of the fineness of the texture. This feature acts as one of the principal criterion of identification and as a useful field separation from the Guelph series.

These soils possess the characteristics of the Grey-Brown Podzolic Group of soils and have the sub-horizons that are common to coarser textured soil materials. The soil profile is well developed and has a thickness of twenty-four inches and occasionally thirty inches. All surface cultivated soil is neutral in reaction while the subsoil horizons are commonly acid.

PERTH SERIES

The Perth series derives its name from Perth County, a section of the province in which these soils occupy rather extensive acreages. These are the imperfectly drained soils developed from clay loam or clay till. They are always associated with the Huron soils, but in contrast occupy the smooth topographic areas. They may occupy the lower slopes of hills or may occur as large blocks of land in areas made up of ground moraine.

As in the case of the Huron soils, the largest acreages of the Perth soils, in Oxford County, is found in Dereham Township, North Norwich and East Oxford Townships. In this part of the county they occupy the broad and gently sloping expanses between the end moraines, the majority of which consist of the Huron soils. The other major areas of occurrence are along the southern boundary of Blenheim Township, the northern boundaries of East Zorra and of East Nissouri Townships. The topography in these areas consists of broad plains with gentle slopes except in the vicinity of Tavistock where there are a number of streams that run parallel to each other across the county boundary. In this area the land is more rolling and the soil drainage is fairly good.

As a general rule the Perth soils have sufficient slope to the landscape to permit some of the surface water to drain away to the depressions, but most of the rainfall enters the soil and it must then move through it to the drainage outlets. Since these are mainly clay textured soils, the movement of excess water is slow and the mottled appearance of the subsoil horizons is an indication that the moisture content of the subsoil is high for many months of the year.

The moisture saturation of the subsoil probably has advantages as well as disadvantages. This is a region in which pasture constitutes 24 per cent of the improved land in the county and tame hay 21 per cent. For these crops, high moisture reserves are important during the rainfall deficient seasons of the year. During the years when spring season rainfall is heavy, these soils are particularly subject to wet and sticky surface soil conditions that delay the seeding and the cultivation of land for cereal grains.

The Perth soils have the normal Grey-Brown Podzolic type of development but are somewhat shallower in their profile depths than is normal in better

drained soils. The depth of the soil in cultivated areas ranges from 14 to 18 inches. The surface soil is black and the color of the subsoil is grey, becoming dark brown at the lower part of the profile. The calcareous clay loam parent material occurs directly below and is well within the rooting zone of all agricultural crops.

A considerable variability in surface soil texture has been included in this series. There are fairly large acreages mapped as clay loam and similarly as silt loam. The clay loam texture is the normal texture for these materials. The occurrence of silt loams is the result in many instances of deposition by water and the texture is frequently fine sand as well as silt. The depth of the silt and fine sand overburden ranges from 6 to 12 inches, with the shallow depth being the most common. Perth silt loam is therefore probably an earlier soil than Perth clay loam and with less problems in cultivation.

These soils are ideal for the production of cultivated hay and cereal crops. The soils in the Tavistock area are highly productive for winter wheat. In South Blenheim Township and East Oxford, the Perth silt loam with its overburden of silt and fine sand may be more adaptable to a greater variety of crops than the clay loam soils but with somewhat less natural productivity. In Dereham Township there are many fields in which some form of artificial drainage would benefit the cereal crops, particularly corn.

Corn growing on Perth silt loam.

BROOKSTON SERIES

The Brookston soils have developed from similar clay and clay loam till as the Huron and Perth soils but under poorly drained conditions. They occur as small irregular shaped depressional areas wherever these clay materials are found.

The total acreage of these soils is small and their land use and productivity in Oxford County is therefore of minor importance.

These soils occupy large acreages in adjoining counties where the characteristics of the soil are similar to those in Oxford County but where land use is considerably different as a result of climatic differences and larger acreages and improvements made through tile drainage. In Oxford County drainage improvement is probably difficult to implement since these soil areas represent the catch basin for the water run-off from adjacent slopes and few outlets are available.

The soil development is typically Dark Grey Gleysolic. In cultivated fields the surface soil consists of a 6 inch depth of black clay loam. This surface is very sticky when wet and in a plowed field produces hard clods that crumble only by weathering. The subsoil horizons consist of a further 6 inches of very dark grey clay that contains infiltrated organic material carried down from the surface soil. This horizon is always mottled and in uncultivated soils is the zone in which reduction is most intense. The lower subsoil horizon is dark grey clay, also strongly mottled and may or may not possess free carbonates. Many of these soils are leached of their carbonates to a depth of 3 feet or more depending on whether the water table lowers during the dry season of the year.

The agricultural use of the Brookston soils is similar to that of the Huron and Perth soils. Hay and spring grains constitute the principal crops grown. In adjoining counties these are the major producing soils for grain corn, soybeans, and canning crops.

HONEYWOOD SERIES

The Honeywood soils are very important agricultural soils in Oxford County. They have a silt loam texture that is almost free of small stones. This absence of stone and the presence of a silty texture gives to the soil characteristics that are generally associated with water-laid or wind-laid deposits.

These soils, however, occur in association with the Guelph soils, which are morainic in origin, and therefore modification and deposition by water was probably the more active process. The soil material was derived from limestones and dolomites that have a high content of silt. The absence of pebbles and stones may also be attributed to dissolution of the carbonates through leaching during the soil formation process.

These silty deposits are generally not deep but consist of a surficial 2 or 3 foot deposit overlying the stony loam till that constitutes the parent material of the Guelph soils. The soil materials have therefore been designated as silty alluvial deposits over calcareous loam till. The areas mapped as Honeywood silt loam are soils having a predominantly silt loam texture to a depth of 3 feet but also comprises inclusions of the Guelph loam to the extent of 15 per cent.

The Honeywood silt loam is identical with the Guelph loam in many of its physical features, land use and probably in productivity. For some special crops it appears to have some decided advantages. In other counties in the province this is an important potato soil since it has an ideal texture, is well drained and is free from stones and pebbles.

The Honeywood soils occur predominantly in the northern half of the county and particularly in Blenheim and East Nissouri Townships. The land-

scape is rolling and frequently hilly and many sand and gravel deposits are associated with them. In these areas the Honeywood soils represent the best agricultural soils of the district. A considerable acreage of winter wheat is produced on these soils in Blenheim Township.

These are typical Grey-Brown Podzolic soils with maximum profile development. The surface and sub-surface horizons are silt loam in texture but the horizon below is nearly always silty clay loam. The overall depth of the profile is usually 3 feet.

Soil erosion will always remain a threat to these soils. The surface is easily erodable and the topography is such that a complete soil cover is needed for all seasons of the year but particularly during the fall and spring.

These soils are capable of producing all crops suitable to the area. Cereal grains such as winter wheat, oats and grain corn is grown, but since dairying is the principal enterprise much of the land is devoted to cultivated hay and pasture.

EMBRO SERIES

Embro silt loam, the imperfectly drained soils associated with the Honeywood silt loam, are among the most important agricultural soils in Oxford County. They are found principally in East Nissouri and West Zorra Townships. A much smaller block is also to be found in central Dereham Township.

These soils have a relatively smooth topography and occupy the broad level plains that lie between morainic hills that surround them on all sides. The position of these plains suggest that they may have represented temporary lacustrian basins. The composition of the soil material and its origin is assumed

Winter wheat growing on tile drained Embro silt loam soils.

to be the same as that which produced the Honeywood soils. The difference between the two series is primarily that of drainage and topography.

The soil consists of a deposit of silt loam having a depth of 2 or 3 feet and overlying a stony loam till. As an agricultural soil it has an ideal texture but possesses some drainage problems. In any one field the drainage conditions vary considerably since the broad plains in which these soils lie contains many small poorly drained depressions. These broad areas of uniform soil materials have a great advantage however, over the rougher topographic areas in that the farm fields can be made larger and that the operation of farm machinery is less difficult.

The soil development is Grey-Brown Podzolic, and the profile contains all the major horizons of that Great Group with mottling present in all but the surface horizon. The surface soil is black in color and on the average has a higher content of organic matter than the better drained Honeywood. The texture of the sub-surface layer is silt loam but is underlain by a layer with a silty clay loam texture. This is the horizon of clay mineral accumulation, and is generally 10 to 12 inches in thickness. The calcareous loam till occurs at depths varying from 24 to 36 inches and can be identified not only by its free carbonate content but also by the presence of pebbles and stone fragments.

The large area of Embro soils in Dereham Township also appear to have had their origin as a lacustrian basin. The natural drainage in this area is not very good and the horizons in the profile indicate this condition by strong soil mottling.

The Embro soils are major producing soils for nearly all crops grown in this region. Any area will be found producing alfalfa, oats, corn or winter wheat. Since dairying is the major agricultural enterprise much of the farm acreage consists of cultivated hay and pasture.

CROMBIE SERIES

The Crombie soil series represents the poorly drained soils that have developed from the same soil materials that in better drained positions have been named Honeywood and Embro. As agricultural soils they are relatively unimportant being small in size and infrequent in occurrence. Examination of the soil map will show that they occur as small irregular shaped areas in East Nissouri and East and West Zorra Townships and in a larger block in Dereham Township.

These poorly drained depressions act as catch basins for excess run-off water and also as reservoirs for eroded surface soil carried down from the adjacent slopes. As in the case of the Embro soils they consist to a large extent of materials of alluvial origin. In this position the depth of the alluvial material is usually greater than is found in the Embro soil locations.

The soil development that has taken place is classified as Dark Grey Gleysolic. This development produces a soil with a black surface horizon 6 to 8 inches in thickness. The texture of the surface soil is always silt loam. The subsurface horizon is olive-grey in color and mottled, indicating that the water table is high during most of the year and that this is the horizon of the most intense reduction. The texture of this horizon is frequently silty clay loam. The next subsoil horizon is also olive-grey in color, somewhat less mottled and with silty clay or clay

textures. The depth to the underlying calcareous till is extremely variable. Soil reaction is generally neutral throughout the profile even though free carbonates may or may not be present.

The agricultural utilization of these soils is limited and any use made of them in the future will depend on the ease with which they can be drained. When tile drained they probably would still be used for the production of cultivated hay and for pasture although spring grains could also be grown.

BENNINGTON SERIES

The Bennington soils, like the Honeywood soils that occur in this part of the county, consist of a stone free silt textured deposit overlying a stony calcareous till. These soil series are differentiated however, on the basis of the texture of the till that underlies the silty overburden. The Bennington soils are underlain by a calcareous clay loam till, the same material that has given rise to the Huron soil series in other locations.

These are well drained soils and occur on a rolling type of topography such as is common to the Honeywood soils. The presence of clay loam textured material below is probably not exerting any appreciable effect on the internal drainage nor the moisture reserve of the silty overburden. These soils can therefore be considered identical with the Honeywood soils in every other respect, and including its use as an agricultural soil. In those situations where the silty overburden is thin or where soil erosion has removed it to a point where the clay loam till is being exposed the clay textured material will then produce a more direct effect on crop growth. At the present time these situations do not seem to be frequent enough to be of any special importance. These soil areas occur adjacent to the Huron and Perth soil areas particularly in East Nissouri and West Zorra Townships. Since the kind of crops being grown in this area are adaptable to a wide range in soil conditions, no changes in the pattern of land use is evident. The crops presently grown on these soils are winter wheat, oats, corn and cultivated hay.

Soil development on these materials has produced a profile that has the normal characteristics of the Grey-Brown Podzolic. The cultivated surface soil is very dark greyish brown in color. The remainder of the profile consists of horizons that are darker brown in color and can be differentiated mostly by texture. The horizon of clay concentration begins at a depth of 18 inches and is ordinarily 12 inches thick. The overall depth of the profile is about 30 inches. The identification of the clay loam till can be determined by the presence of free carbonates or by the abrupt occurrence of small stones mixed with the clayey material.

The Bennington soils like the Honeywood soils are easily erodable. The gradual movement of the surface soil to the lower slopes in the landscape, is going on continually on bare cultivated fields. The extent to which this has taken place can be readily checked by digging with a spade near the foot of a slope. In such locations the soil may have a black surface, that is 24 inches and frequently 36 inches in depth. The normal thickness of this surface horizon should not be more than 6 or 8 inches. This process is generally not detected until rills and gullies begin to develop, at which stage the action is much more severe.

The control lies principally in maintaining a surface crop cover throughout the year. Suitable crop rotations that permit such practices are more important on these soils than many other soils in the district.

TAVISTOCK SERIES

The Tavistock series must be included among the major agricultural soils occurring in Oxford County. They are found only in East Nissouri and in West and East Zorra Townships. These soils occupy the smoothly sloping plain-like areas that lie outside the drumlins and end moraines. The topographic position of these soils is therefore similar to the Embro series but they are not completely surrounded by morainic hills such as the latter. Like the Embro soils they appear to be of alluvial origin, a deposition that may have taken place in a temporary lake basin.

This alluvial material has a silt loam texture and is free from pebbles and stones. It overlies a clay loam till and is therefore similar in origin and mechanical composition to the Bennington soil series. The Tavistock soils in contrast, are imperfectly drained, partly as a consequence of their smooth and gentle slopes and probably also as a result of the presence of the slowly permeable clay loam till that lies at a depth of 1½ to 3 feet below the surface. The surface drainage pattern is complicated by the presence of many small depressions. These do not form ponds but they trap a certain amount of the surface drainage waters.

The largest single block of these soils lies to the south of the town of Tavistock. This is a region that is devoted mainly to dairying. Beef cattle herds are present also but in smaller numbers. This is therefore a livestock producing area and one in which cultivated hay, oats and pasture are the crops that take up most of the acreage of improved land. Other crops include corn, which is produced and used as grain and silage and field turnips that are grown commercially for table use. The use in this area of soil conserving crops has been a continuing practice since these soils were first brought under cultivation and a permanently productive soil has been the result. This conservation effect is enhanced by the fact that soil erosion is not a problem in these soil areas.

The Tavistock series possesses the normal Grey-Brown Podzolic characteristics. The surface soil, with a depth of 6 inches, is either dark grey or black in color. This is a friable silt loam soil with a fairly high content of organic matter. Two subsoil horizons can readily be differentiated, the upper one has a silt loam texture and the lower is either silty clay loam or clay loam. The calcareous clay loam till is at a depth of approximately 30 inches. Mottling is present in all horizons but is not very pronounced. The soil reaction is neutral to slightly acid in both surface and subsoil horizons. The free lime that was originally present in the soil has therefore been leached out of the silt textured overburden.

MAPLEWOOD SERIES

The Maplewood soils occupy less than one per cent of the land area of the county and therefore from the standpoint of the production of crops are of little agricultural value. These soils are poorly drained and represent the depression or water ponded areas associated with the Bennington and Tavistock soil series.

The soil material is similar to that of the Tavistock series and consists of a silt textured deposit overlying a clay loam till. In most instances the depth of the silt overburden is greater than in the Tavistock soils since it consists, to some extent, of an accumulation of eroded surface soil carried in from the surrounding slopes of the hills.

The agricultural use that is made of these soils depends upon the amount of tile drainage that has been instituted in order to remove the excess water. Late in the summer the water table drops to a sufficient depth to drain the soil completely.

These soils are classified as Dark Grey Gleysolic and have the typical profile features of that group of soils. The surface soil is black and has a high content of organic matter. With a little more accumulation of organic matter they would be considered as a muck soil. The subsoil horizons are very strongly mottled and are divisible into two horizons differing only in the shades of gray colors, the upper horizon being lighter gray than the lower horizon. The soil reaction is neutral throughout the profile but becomes alkaline at depths of 24 to 30 inches where free carbonates are present.

Maplewood silt loam soil profile, with shallow muck surface and grey colored mineral soil horizons.

FOX SERIES

The Fox soils are widely known by that name in this region of the province. These are the principal tobacco soils in south western Ontario and some of the best areas occur in Oxford County. In this county they occur specifically in Blenheim, South Norwich and Dereham Townships and in each of these townships the soils are used for the production of tobacco.

The soil parent material is calcareous sand, deposited either as glacial outwash or as deltaic material in some of the early glacial lakes. Considerable variability therefore exists in the depths of sand deposited; in the amount of admixture there is with loam textured tills; and in the degree of sorting of the sand into its various sizes.

In addition to the variability of the soil materials there is also a diversity of soil profile development, that presents some difficult problems to the soil surveyor. The soils in this region are classified as Grey-Brown Podzolic and its characteristics have been described in a previous section. In these sandy deposits, in which the Fox series represents the well drained member, it is possible to find well developed podzol profiles in association with those in which the Grey-Brown Podzolic characteristics are well expressed. The depth to the calcareous sand parent material varies tremendously within short distances and is related to the irregular development of the textural horizon of the Grey-Brown Podzolic soil. In selected road cuts it is possible to find the depth of the textural B horizon from the surface, varying from three to eight feet.

This complexity within the soil profile and in the nature of the soil material, no doubt produces some direct effects on its land use and on its productivity. The Fox soils for example in Blenheim and Blandford Townships are producing a variety of crops with a success equal to that on finer textured soils. Crops such as winter wheat, oats, alfalfa, hay and tobacco are being grown. In these townships there is no visible difference in crop growth between the Fox soils and adjacent loam textured soils. This area possesses more admixture of loam till in association with the sand than in any other section of the county.

These soil areas also possess a variable topography. Much of the land is rolling and has been designated in this survey as a rolling phase. The slopes are generally not too steep for cultivation and are producing all of the crops commonly grown in this region. The tobacco crop is generally confined to those soil areas with a more gentle relief. Since the Fox soils with rolling topography occur predominantly in the north half of Blenheim Township tobacco is not produced in this section of the county to any great extent. The most productive tobacco areas are in the south half of Blenheim Township and in South Norwich. These latter areas have been designated as having a loamy sand surface texture as compared with the sandy loam surface textures of North Blenheim. Associated with the loamy sand texture is a low content of organic matter, a condition that is expressed in the color of the soil. These soils are therefore used almost exclusively for the production of tobacco which alternates with rye in the crop rotation.

The description of the Fox series as Grey-Brown Podzolic is based on the soil profiles in which the textural B horizon appears within the surface three feet of soil depth. This soil profile possesses a very thin surface horizon and is followed

Tobacco crop growing on Fox soils, with sprinkler irrigation in right background.

Clover hay and corn growing on soils of the Fox—rolling phase near Blenheim Township.

in depth by yellowish brown subsurface horizons to a depth of 30 inches. The textural B horizon is rarely more than 6 inches thick and is generally sandy loam.

Before the introduction of the tobacco crop into this part of Ontario, the loamy sand and sand members of the Fox series were not used as agricultural land to any great extent, since they had poor water-holding capacity and were generally unproductive. The use of irrigation in the production of tobacco now is a common practice and in most years an adequate supply of water can be obtained for this purpose from the creeks and small streams that traverse the area. The introduction of the tobacco crop therefore has converted the market price of the Fox soils from a very low figure to the highest priced soils in the county.

These sandy soils are usually slightly acid, a condition that exists in all horizons of the profile. The surface cultivated soil in fields that are adjacent to gravel roads frequently have a neutral reaction, a remedy that has been brought about by dust from the calcareous gravel road. Since acid soils are preferred for the production of tobacco, the liming of the soil for agricultural crops is not a consistent practice.

BRADY SERIES

The Brady soil series consist of imperfectly drained soils developed on sand deposits. In this region all sandy deposits are underlain at various depths by fine textured till or lacustrian clay and have originated either as outwash or as deltaic material in early glacial lakes. Since the soil characteristics are similar in all cases no attempt was made in this survey to differentiate the mode of deposition.

The Brady soils therefore occur in association with the Fox soils in landscapes that are both rolling and smooth. They occupy flat areas that have no visible slope. Small areas of these soils occur in Blandford and Blenheim Townships and consist of individual blocks of land varying in size from 20 to 200 acres. Larger and more continuous blocks of these soils occur in North Norwich and South Norwich in association with sand deposits of deltaic origin. In these latter townships the topography is flat and stream development in these imperfectly drained areas is lacking in nearly all cases.

The horizons of the soil profile are slightly mottled, the increase in mottling and hence in more poorly drained conditions, increases with depth in the profile. Occasionally iron pan formation will occur in the lower subsoil horizons but it is rarely continuous and doesn't appear to be a serious condition in any of the areas surveyed.

The Brady soils are classified as Grey-Brown Podzolic but are perhaps less typical of this group of soils than any other soils in the county. In these imperfectly drained positions the eluvial Podzol horizon is often well developed and it is difficult to identify the textural B horizon that is characteristic of the Grey-Brown Podzolic group of soils. A dark brown subsoil horizon is always present in both thick and thin profiles but consists of an accumulation of organic materials with only a slight concentration of clay. The surface soil is generally very dark in color, either dark grey or black and is 6 to 8 inches in thickness. The soil reaction is neutral in the surface soil and only slightly acid in the sub-surface horizons where it is rarely less than 6.5.

The Brady soil areas have been cleared and put under cultivation. At the present time some are used for growing all the various crops that are adapted to the region and in other locations tobacco is the principal crop. It is evident however, that these are not very productive soils regardless of the kind of crop being grown, the only exception being the areas that occur in Dereham Township. These latter soils are in a location where dairying is the major farm enterprise and the production of cultivated hay appears to be equal to that being produced on adjacent finer textured soils.

GRANBY SERIES

The Granby soils consist of poorly drained sands found in the same landscape as the Fox and Brady soils. These are depressional areas that possess a moving water table, that is one that rises and falls during the various seasons of the year. In the late summer the water is removed from the soil profile by natural drainage systems, but for the greater part of the year the soil is saturated with water.

The soil profile that is produced under these conditions is classified as Dark Grey Gleysolic. In the uncultivated state a 6 inch surface horizon high in organic matter is always present. Under cultivation this becomes mixed with the underlying sand horizon. The subsurface horizons are grey in color and can be differentiated into two horizons based on the intensity ot the grey color, the upper being lighter grey than the lower horizon. All mineral horizons are strongly mottled. The calcareous sand is generally present at about 20 inches.

These are not agricultural soils and only rarely are they cultivated. They serve as farm woodlots and when cleared as pasture or grazing land.

BURFORD SERIES

The Burford soil series consist of well drained soils that have developed from gravel deposits or that possess a gravel subsoil with finer material deposited at the surface. In many areas these deposits have occurred as stream laid materials and are therefore found along the banks of present day streams. Other areas owe their origin to glacial outwash on level land surfaces, and in these locations the texture of the deposits show a much wider range between the coarse and fine materials. Although the underlying material consists of coarse gravel, the surface soil, to a depth of one or two feet, may consist of sand, producing a sandy loam texture and frequently loam. It should be noted that the Burford soils, as they occur in Oxford County, are not uniform and consistent in the texture and composition of the soil material.

These soils occupy about three per cent of the total land area of the county and occur chiefly in North Oxford and Blenheim Townships. The largest of these soil bodies occurs between Thamesford and Ingersoll at the confluence of the branches of the Thames river. This is a complex area of gravel, sand and loam till and is quite variable in relief.

The topography of these soils is, in the main, very gently sloping to level. The areas with sloping topography are found in association with the morainic hills in Blenheim Township. In this township, sand is almost as much a com-

Soil profile of the Burford series, a shallow Grey-Brown Podzolic soil.

ponent of the soil material as gravel and the soils with a continuous gravel base are most frequently associated with stream courses as gravel terraces. In general the gravel terraces possess the most even topography.

The Burford soils cannot be classed as being best for any one kind of agricultural crop. They are producing with equal success crops such as tobacco, corn, spring grains, winter wheat, cultivated hay and canning crops. The soils producing tobacco are found in Blenheim Township, in areas in which there is only a thin covering of sandy loam surface soil overlying the gravel. It is evident that a twelve inch deposit of sandy loam is all that is required in order that these soils may be used for tobacco. The soils in North Oxford are producing corn and the crops associated with the dairy enterprise. The underlying gravel is in demand for the construction of highways and county roads and most of the deposits are deep and well sorted. Some agricultural soils are therefore giving way to gravel pits.

The Burford soil is classified as Grey-Brown Podzolic. This development is well expressed in soils having a sandy or loam texture. The textural B horizon is always located at the juncture between two variable textured deposits and is

therefore present at the boundary between the gravel and the overlying sandy loam or loam. The depth of the profile varies accordingly with the depth of the overlying deposit. The surface soil is thick and very dark in color. All soil horizons are neutral in reaction.

BRISBANE SERIES

The Brisbane soils are of little agricultural importance in this county. They consist of imperfectly drained soils developed on materials that are similar to those that produced the Burford soils. The conditions regarding origin, that have been stated for the Burford soils, apply as well to the Brisbane.

These soils occur principally in Blenheim Township on level landscape areas where both external and internal drainage is slow. Some of these areas are adjacent to the Nith river and probably represent lower terraces with a gravel subsoil and with a finer alluvial deposit occurring at the surface. Other locations within the county represent outwash materials in areas of morainic till.

There is little distinction that can be made between the Burford and Brisbane soils in regard to land use, other than in the production of tobacco. The individual areas would need to be carefully examined for their suitability for this crop. All other crops that are commonly grown in this region can be produced successfully on these soils.

The Brisbane soils are classified as Grey-Brown Podzolic and have much the same profile characteristics as the Burford series. The horizons are rather strongly mottled and the development of the textural B horizon is not as pronounced as in the case of the Burford. These soils are neutral in reaction throughout the profile.

GILFORD SERIES

The Gilford series represent the poorly drained soils of outwash origin, with a finer textured alluvial deposit occurring at the surface. They occupy depressional or undrained areas that occur adjacent to the Nith river in Blenheim Township.

These soils are classified as Dark Grey Gleysolic, having developed under water saturated conditions. These areas are not permanently saturated, since that condition leads to the formation of Muck. The water table drops to a lower level during the latter part of the summer season, and becomes saturated again in the fall.

The profile possesses a black surface horizon 6 to 8 inches thick, that is very high in organic matter content. The subsoil horizons are grey and strongly mottled, and the calcareous gravel most commonly occurs at 18 inches. The soil reaction is neutral throughout the profile.

These are essentially non-arable soils but in some cases can be used as pasture land. The majority of these soil areas are uncleared and serve as farm woodlots.

BOOKTON SERIES

The Bookton series consist of soils developed on sandy deposits that overlie clay. These soils occur wherever the main deposits of outwash or deltaic sand

merge with an adjacent clay textured plain. The depth of sand varies therefore from a thin veneer over the clay to a depth of many feet within the main body of sand.

An arbitrary depth of 3 feet and less, of sand overlying clay, has been chosen as the range of variability for this soil. In general the depth of sand in the areas mapped as Bookton will be found to vary between 12 and 36 inches.

These are well drained soils having a gently sloping topography. In most situations where these soils occur, the underlying material is a clay till. The sloping topography therefore is the result mainly of undulations in the till deposit. Any excess water that drains through the sand to the clay subsoil will drain away much more readily under these conditions than if the clay deposit had a flat relief.

The Bookton soil areas are confined mainly to the lower edge of Blandford Township, in the vicinity of Eastwood and a block of land south of Otterville in South Norwich has the greater variability in soil characteristics. In this situation, surface soil erosion appears to have exposed the underlying till and many stones can be observed on the cultivated slopes. The areas in Blandford Township are much more uniform in the depth of the sand overburden.

These soils are cultivated and used in the production of all crops suitable for the region. They are also producing tobacco although it is evident that the crop is growing in the clay till in some locations. Where the depth of sand is uniform, the tobacco crops appear as productive as that which is grown on deeper sand deposits.

The Bookton series is classified as Grey-Brown Podzolic. These soils possess the dark colored surface horizon and the brown colored subsoil horizons that are characteristic of this group of soils. The textural B horizon is at the juncture of the sand and clay and is most frequently developed within the clay material. It has a dark brown color and contrasts strongly with the underlying grey colored calcareous clay till. The soil reaction of the profile is acid in the sand deposit and neutral to alkaline in the clay till deposit.

BERRIEN SERIES

The Berrien series consist of imperfectly drained soils with sandy surface materials and clay subsoils. These soils occur in areas that possess a topography that is nearly level, so that a temporary perched water table exists at the junction of the clay and sand deposits. This produces an internal water-logged condition that may not be noticeable at the soil surface. The characteristics of the Berrien soils in regard to the depth and origin of the soil material are identical with the Bookton soils but differ from them in drainage and in topography.

These soils are located principally in the vicinity of Verschoyle in Dereham Township and near Eastwood in Blandford Township. Much larger areas of similar soils are found in some of the counties adjacent to Oxford County.

The agricultural crops that are grown on these soils are the same as those that are grown on the Bookton soils. Imperfect drainage, however, places some restriction on their adaptation for the tobacco crop.

These soils are classified as Grey-Brown Podzolic, but the expression of the various horizons is not as pronounced as it is in the Bookton soils. The

textural B horizon, when it is present, occurs at the junction of the sand and clay, but frequently it is absent and the brown colored sandy eluvial horizons lie directly on the calcareous clay.

WAUSEON SERIES

The Wauseon soils consist of poorly drained soils with sandy surface materials and clay subsoils. They occur in depressional areas in association with the Bookton and Berrien series. Small areas that are an acre or less in size do not appear on the soil map. These are areas of temporary water-ponding that usually dry up towards the end of the summer season. They are classified as Dark Grey Gleysolic and possess the horizon characteristics typical of this group of soils.

DONNYBROOK SERIES

The Donnybrook soils are gravelly textured soils occurring in hills and ridges that are more specifically designated as kames and eskers. These kame deposits as they occur in Oxford County are associated with end moraines and are located principally in the northern part of West Zorra Township and in the central portion of Blenheim.

The topography in these locations is hilly, and slopes are steep. The gravel and sand materials are stratified and the soil occurring at the surface alternates between these two textures. These are non-agricultural soils and where the deposits are not being worked for road materials, the hill slopes are covered with forest vegetation.

The topography that is associated with the Donnybrook soils serves to differentiate them from the Burford soils, to which they are related in regard to soil materials. In the latter however, the mode of deposition as an outwash apron and the more prevalent occurrence of sandy textures helps to establish them as a more reliable agricultural soil.

Soil development is commonly thin on coarse gravelly materials, the depth of the profile rarely exceeding 12 or 18 inches. These soils are classified as Grey-Brown Podzolic and the major horizons of this group of soils are present in the short profile. When seen in cross section the lower boundary of the textural horizon occurs as tongues extending into the underlying calcareous gravel. This horizon is dark brown in color and its clay content may not be more than 2 per cent higher than the horizons above it. All horizons of the profile are neutral in reaction.

HONEYWOOD-GUELPH COMPLEX

The Honeywood-Guelph complex of soils comprises much of the drumlin field area that occurs south and north of the city of Woodstock. The Honeywood series and the Guelph series which are here combined, have been described previously in this report. These soil series are differentiated primarily on the basis of texture, in which the Honeywood soils possess silt loam textured profiles and the Guelph, loam textured profiles. In addition the Honeywood soils with their silt loam textures contain few stones and pebbles in contrast with the more

stony nature of the Guelph soils. The till that forms these drumlins is therefore variable in composition and this in turn produces soils with differing physical properties.

Although these soil series can be recognized as separate entities, they occur in this area, not as separate blocks of soils but rather as mixed profiles that alternate from silt loam to loam. The area is therefore most aptly described as a complex of the respective soil series.

The land use that is applied to this complex of soils is the same as that for the individual series. This is primarily a dairy type of farming area and the principal crops are spring grains and cultivated hay. Corn is not grown to any extent and winter wheat is very rare. All the land is under cultivation except for woodlot areas that are present on every farm. These consist entirely of hardwood vegetation and a similar vegetation is expanding along the fence rows that surround the cultivated fields. In appearance, this is one of the most prosperous agricultural areas in Oxford County.

BOTTOM LAND

The term bottom land is applied to all soils that occur on variable textured alluvial deposits in stream, river and creek beds. The size of these areas vary with the meander of the stream rather than the size of the stream itself. The largest areas occur in the bed of the Thames river and its tributaries, in the Nith River channel and the bed of the Trout Creek in East and West Nissouri Townships.

The soil material found in these locations consists of alluvial sands, silts and clays laid down by streams at various times of the year but very largely during the spring thaw. The texture of the material that is deposited is influenced by the source of supply and the velocity of the stream during deposition. Most of these areas of bottom land consist of layers of variable textured sediments.

The soils that are classified as bottom land vary in their agricultural adaptation from fair pasture land to good arable soils. Most of these soil areas are being used as pasture land and are excellent for this purpose. Where the water table remains high for a large part of the season a surface accumulation of muck is frequently present. The areas that can be cultivated and used as crop land are those associated with the Thames river valley.

These soils have no profile development. The soil reaction is neutral in all locations.

MUCK

The soils that have been classed as Muck consist of organic deposits that have accumulated in shallow lakes, ponds or wet undrained depressions. These soils differ from the soil series previously described in that they are derived from former living plants or organic matter.

In this region of Ontario, organic deposits decompose fairly thoroughly leaving black organic material that is fine in texture mixed with coarser fragments of bark and woody material from trees. The fine material is derived principally from sedges and grasses and the leaf litter that is annually deposited by the hardwood vegetation.

Muck soil is a common occurrence, and every undrained depression is a possible site for such materials to accumulate. The condition that is required to promote this development is a locale that is water saturated for the entire year. Such locations are frequent in this glaciated region, both in the upland till plain areas and in the meandering stream channels or old glacial spillways. The depth of Muck varies from a few inches to several feet. In general the depths of the deposits are shallow and rarely exceed three feet.

There is little commercial development of these Muck soils for the production of agricultural crops. The principal deterrant in this regard is the size of the areas themselves. A successful enterprise requires larger individual blocks of Muck soils than are present in this county. There are many areas however that could be developed by individual farmers for the production of special vegetable crops and one of the best in this respect is the area west of Dereham centre in Dereham Township. The majority of these Muck soils are covered with a dense stand of hardwood vegetation. The difficulty of providing suitable drainage outlets and the high cost of clearing makes these Muck areas commercially unattractive.

SOIL RATING

The suitability of the various soils that occur in Oxford County, for the growing of cultivated crops, has been discussed in the preceding pages of this report. In the table that follows an attempt is made to summarize the suitability of each soil for all the crops that are commonly grown in the county.

The different soil series and phases have been rated for specified crops on the basis of six categories namely, good, good-fair, fair, fair-poor, poor, and very poor. This rating represents an estimate of the suitability of the soil based on the characteristics of the soil itself, and the appearance of crops growing on the soil, together with information supplied by farmers and officers from Agricultural Stations. Although the reliability of these ratings has not been verified by crop yield figures they have in other counties proven to be reasonably accurate for purposes of farm management and land use planning.

The internal drainage of the soil is one of its most important characteristics, since poorly drained soils are rarely, if ever, productive. It is possible for grass crops to survive and frequently flourish under extremely wet conditions but most cultivated plants cannot remain too long in soils that are saturated with water. A rating has therefore been given for each soil under drained conditions, where tile drainage or some other form of artificial drainage has been installed to remove the surplus water.

A summary of the acreages of land that have been classified as belonging in each of the three drainage classes are as follows:

	acres	% of total
Well drained soils	294,000	60.13
Imperfectly drained soils	150,100	30.65
Poorly drained soils	45,100	9.21

TABLE 4

*SOIL RATINGS FOR PRINCIPAL CROPS

Soil Name	Winter Wheat		Oats		Corn		Alfalfa		Tobacco		Turnips		Cultivated Hay		Pasture		Tree-Fruits Apples		Vegetable Crops, Tomatoes, Peas, Sweet Corn	
	Soil Ratings For																			
	Dr.	Und.	Dr.	Und.	Dr.	Und.	Dr.	Und.	Dr.	Und.	Dr.	Und.	Dr.	Und.	Dr.	Und.	Dr.	Und.	Dr.	Und.
Bennington silt loam		G		G		G		G		VP		G-F		G		G		G-F		G
Berrien sandy loam	F-P	P	F	F-P	F-P	P	F	P	F	P	F	P	F	P	F	P	F-P	P	G-F	P
Bookton sandy loam		F-P		F-P		F-P		F		F		F		F		F		F-P		F
Bottom land		VP		P		P		P		VP		P		F		G-F		VP		P
Brady loamy sand	F	F-P	F	F-P	F	F-P	F	P	F	VP	P	VP	F	F-P	F	F-P	F	P	F	P
Brisbane sandy loam	F	F-P	F	F-P	F	F-P	F	P	F	VP	P	VP	F	F-P	F	F-P	F	P	F	P
Brookston clay loam	F	P	F	P	F	P	F	P	VP	VP	F	P	G-F	F	G-F	F		P	F	P
Brookston silt loam	F	P	F	P	F	P	F	P	VP	VP	F	P	G-F	F	G-F	F		P	F	P
Burford loam		G-F		G-F		G		G-F		F		F		G-F		G-F		G		G
Burford sandy loam		G-F		G-F		G		G-F		G-F		F		G-F		G-F		G		G
Crombie silt loam	F	P	G-F	F-P	G-F	P	F	VP	VP	VP	G-F	P	G-F	F	G-F	F	VP	VP	G-F	P
Donnybrook sandy loam		P		P		P		P		P		P		P		P		P		P
Embro silt loam	G-F	F	G	G-F	G	F	G-F	F	VP	VP	G	F	G	G-F	G	G-F	F	P	G	F
Fox loamy sand		P		P		P		P		G-F		P		P		P		F		P
Fox sandy loam		F		F		G-F		F		G		P		F		F		G		G-F
Fox fine sandy loam		F		F		G-F		F		G		P		F		F		G		G-F
Gilford sandy loam	F-P	VP	F	P	F	VP	P	VP	VP	VP	P	VP	F	P	F	P	P	VP	F	VP
Granby sandy loam	P	VP	F	P	F	VP	P	VP	VP	VP	P	VP	F	P	F	P	P	VP	F	VP
Guelph loam		G		G		G-F		G		P		G-F		G		G		G		G-F
Guelph silt loam		G		G		G-F		G		P		G-F		G		G		G		G-F
Honeywood silt loam		G		G		G-F		G		P		G-F		G		G		G		G-F
Honeywood-Guelph Complex		G		G		G-F		G		P		G-F		G		G		G		G-F
Huron clay loam		G		G		G		G-F		P		G-F		G-F		G-F		F		G-F
Huron silt loam		G		G		G		G		P		G-F		G		G		G-F		G-F
London loam	G-F	F	G	G-F	G	F	G-F	F	VP	VP	G	F	G	G-F	G	G-F	F	P	G	F
London silt loam	G-F	F	G	G-F	G	F	G-F	F	VP	VP	G	F	G	G-F	G	G-F	F	P	G	F
Maplewood silt loam	F	P	G-F	F-P	G-F	P	F	VP	VP	VP	G-F	P	G-F	F	G-F	F	VP	VP	G-F	P
Muck																				
Parkhill loam	F	P	G-F	F-P	G-F	P	F	VP	VP	VP	G-F	P	G-F	F	G-F	F	VP	VP	G-F	P
Parkhill silt loam	F	P	G-F	F-P	G-F	P	F	VP	VP	VP	G-F	P	G-F	F	G-F	F	VP	VP	G-F	P
Perth clay loam	G-F	F	G	G-F	G	F	G-F	F	VP	VP	G-F	F	G	G-F	G	G-F	F	P	G-F	F
Perth silt loam	G-F	F	G	G-F	G	F	G-F	F	VP	VP	G	F	G	G-F	G	G-F	F	P	G	F
Tavistock silt loam	G-F	F	G	G-F	G	F	G-F	F	VP	VP	G	F	G	G-F	G	G-F	F	P	G	F
Wauseon sandy loam	P	VP	P	VP	P	VP	P	VP	VP	VP	P	VP	F	P	F	P	P	VP	F	VP

*These ratings are based on general farm management practices and apply specifically to Oxford County.

TAXONOMIC CLASSIFICATION, PROFILE DESCRIPTIONS AND ANALYTICAL DATA

BENNINGTON SERIES

PARENT MATERIAL: Silty alluvial deposits overlying clay till.
*CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Honeywood.

HORIZON	DEPTH INCHES	DESCRIPTION
A_1 (Ah)	0-4	Silt loam; very dark greyish brown (10YR3/2); medium crumb structure; friable; pH 6.4.
A_{21} (Ae1)	4-11	Silt loam; yellowish brown (10YR5/4); weak platy; friable; pH 5.0.
A_{22} (Ae2)	11-20	Silt loam; brown (10YR5/3); medium subangular blocky, friable; pH 5.0.
B_2 (Bt)	20-32	Clay loam; dark greyish brown (10YR4/3); medium angular blocky; pH 5.7.
D	32+	Clay; greyish brown (10YR5/2); calcareous, compact, pH 7.4.

TABLE 5

ANALYSES OF BENNINGTON SILT LOAM

HORIZON	DEPTH INCHES	SAND %	SILT %	CLAY %	pH	ORGANIC MATTER %
A_1 (Ah)	0–4	29	52	19	6.4	14.7
A_{21} (Ae1)	4–11	21	58	21	5.0	4.4
A_{22} (Ae2)	11–20	29	50	21	5.0	2.3
B_2 (Bt)	20–32	25	36	39	5.7	1.3
D	32+	19	27	54	7.4	0.6

BERRIEN SERIES

PARENT MATERIAL: Sand overlying calcareous clay till.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Berrien.

HORIZON	DEPTH INCHES	DESCRIPTION
A_1 (Ah)	0-5	Sandy loam; very dark greyish brown (10YR3/2); weak fine crumb; friable; pH 6.0.
A_2 (Aeg)	5-15	Sand; pale brown (10YR6/3); mottled; single grain; loose; pH 6.0.
B_2 (Btg)	15-20	Sandy loam; dark brown (10YR4/3); mottled; weak blocky; friable; pH 6.4.
D (II)	20+	Clay; greyish brown (10YR5/2); calcareous; pH 7.8.

*The classification of each series is made on the basis of the definitions prepared by the National Soil Survey Committee. 1958.

BOOKTON SERIES

PARENT MATERIAL: Sand overlying calcareous clay till.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Bookton.

HORIZON	DEPTH INCHES	DESCRIPTION
A_1 (Ah)	0-3	Sandy loam; very dark greyish brown (10YR3/2); single grain; loose; pH 5.5.
A_{21} (Ael)	3-9	Sand; yellowish brown (10YR5/6); single grain; loose; pH 6.0.
A_{22} (Ae2)	9-20	Sand; brownish yellow (10YR6/6); single grain; loose; pH 6.0.
B_2 (Bt)	20-24	Clay loam; dark brown (10YR4/3); coarse blocky; firm; pH 6.0.
D (II)	24+	Clay; greyish brown (10YR5/2); calcareous; pH 7.8.

BRADY SERIES

PARENT MATERIAL: Calcareous medium and fine sand.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Brady.

HORIZON	DEPTH INCHES	DESCRIPTION
A_c (Aa)	0-9	Sandy loam; very dark brown (10YR2/2); fine crumb structure; soft; pH 6.5.
A_2 (Aeg)	9-20	Sand; brown (10YR5/3); mottled; single grain; loose; pH 6.8.
B_2 (Btg)	20-22	Sandy loam; brownish yellow (10YR6/6); mottled; crumb structure; soft; pH 6.5.
B_3 (Bmg)	22-30	Sand; light yellowish brown (10YR6/4); mottled; loose; pH 7.0.
C		Sand; light brownish grey (10YR6/2); loose; pH 7.2.

BRISBANE SERIES

PARENT MATERIAL: Loam and sandy loam material overlying coarse gravel.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Brady.

HORIZON	DEPTH INCHES	DESCRIPTION
A_c (Aa)	0-5	Sandy loam; very dark grey (10YR3/1); fine granular structure; friable; pH 7.0.
A_2 (Aeg)	5-10	Sandy loam; brown (10YR5/3); mottled; weak fine subangular blocky; friable; pH 6.8.

B_2 (Btg)	10-18	Loam; dark greyish brown (10YR4/2); mottled, medium subangular blocky; friable; pH 7.2.
C	18+	Gravel; pale brown (10YR6/2); calcareous.

BROOKSTON SERIES

PARENT MATERIAL: Calcareous clay and clay loam till.
CLASSIFICATION: Order – Gleysolic.
Great Group – Dark Grey Gleysolic.
Family – Brookston.

HORIZON	DEPTH INCHES	DESCRIPTION
A_c (Aa)	0-6	Clay loam; very dark brown (10YR2/2); granular structure; friable; pH 7.0.
G_1 (Amgl)	6-13	Clay; grey (5Y5/1); moderate mottling; blocky structure; firm; pH 7.2.
G_2 (Amg2)	13-27	Clay; olive grey (5Y5/2); strongly mottled; coarse blocky structure; pH 7.2.
C	27+	Clay; grey (10YR5/1); strongly mottled; calcareous, pH 7.6.

BURFORD SERIES

PARENT MATERIAL: Loam and sandy loam material overlying coarse gravel.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Burford.

HORIZON	DEPTH INCHES	DESCRIPTION
A_c (Aa)	0-4	Sandy loam; very dark greyish brown (10YR3/2); fine crumb structure; friable; pH 7.0.
A_2 (Ae)	4-9	Sandy loam; brown (10YR5/3); weak fine subangular blocky; friable; pH 6.8.
B_2 (Bt)	9-18	Loam; dark greyish brown (10YR4/2); medium subangular blocky; friable; pH 7.2.
C	18+	Gravel; pale brown (10YR6/3); calcareous.

CROMBIE SERIES

PARENT MATERIAL: Calcareous silty till and alluvial deposits.
CLASSIFICATION: Order – Gleysolic.
Great Group – Dark Grey Gleysolic.
Family – Colwood.

HORIZON	DEPTH INCHES	DESCRIPTION
A_c (Aa)	0-8	Silt loam; very dark brown (10YR2/2); fine crumb structure; friable; pH 7.0.
G_1 (Amgl)	8-17	Silt loam; grey (10YR5/1); mottled, medium subangular blocky; friable; pH 6.8.

G_2 (Amg2)	17-30	Loam; dark yellowish brown (10YR4/4); mottled; medium subangular blocky; friable; pH 7.4.
C	30+	Silt loam; light brownish grey (10YR6/2); calcareous; pH 7.7.

DONNYBROOK SERIES

PARENT MATERIAL: Calcareous gravel.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Dumfries.

HORIZON	DEPTH INCHES	DESCRIPTION
A_1 (Ah)	0-3	Gravelly sandy loam; brown (10YR4/3); loose.
A_{21} (Ael)	3-11	Gravelly sandy loam; yellowish brown (10YR5/6); loose.
A_{22} (Ae2)	11-13	Gravelly loamy sand; pale brown (10YR6/3); loose.
B (Bt)	13-16	Gravelly sandy loam; brown (10YR5/3); loose.
C	16+	Gravel and cobblestones; light grey (10YR7/2); loose.

EMBRO SERIES

PARENT MATERIAL: Calcareous silty till and alluvial deposits.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Tuscola.

HORIZON	DEPTH INCHES	DESCRIPTION
A_c (Aa)	0-9	Silt loam; very dark greyish brown (10YR3/2); fine crumb structure; friable; pH 6.8.
A_2 (Aeg)	9-15	Silt loam; brown (10YR5/3); slightly mottled; fine granular; friable; pH 6.9.
B_2 (Btg)	15-24	Silty clay loam; dark brown (10YR4/3); mottled; medium subangular blocky; friable; pH 7.3.
C	24+	Silt loam; pale brown (10YR6/3); calcareous; pH 7.9.

FOX SERIES

PARENT MATERIAL: Calcareous medium and fine sand.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Fox.

HORIZON	DEPTH INCHES	DESCRIPTION
A_1 (Ah)	0-2	Sand; very dark greyish brown (10YR3/2); loose; pH 6.8.
A_{21} (Ael)	2-12	Sand; yellowish brown (10YR5/6); single grain; loose; pH 6.0.

A_{22} (Ae2)	12-24	Sand; brownish yellow (10YR6/6); single grain; loose; pH 6.0.
B_2 (Bt)	24-30	Sandy loam; dark yellowish brown (10YR4/4); single grain; loose; pH 6.6.
C	30+	Sand; light brownish grey (10YR6/2); calcareous; loose; pH 7.2.

GILFORD SERIES

PARENT MATERIAL: Loam and sandy loam material overlying coarse gravel.
CLASSIFICATION: Order – Gleysolic.
Great Group – Dark Grey Gleysolic.
Family – Granby.

HORIZON	DEPTH INCHES	DESCRIPTION
A_1 (Ah)	0-6	Sandy loam; very dark brown (10YR2/2); fine granular structure; friable; pH 7.0.
G (Amg)	6-9	Loam; greyish brown (10YR5/2); mottled; medium subangular blocky; friable; pH 7.2.
C	19+	Gravel; brown (10YR5/3); calcareous.

GRANBY SERIES

PARENT MATERIAL: Calcareous medium and fine sand.
CLASSIFICATION: Order – Gleysolic.
Great Group – Dark Grey Gleysolic.
Family – Granby.

HORIZON	DEPTH INCHES	DESCRIPTION
A_c (Aa)	0-6	Sandy loam; black (10YR2/1); fine crumb structure; soft; friable; pH 7.5.
G_1 (Amg1)	6-10	Sandy loam; light olive grey (5Y6/2); low contrast mottling; loose; pH 7.8.
G_2 (Amg2)	10-20	Sand; olive grey (5Y5/2); low contrast mottling; loose; pH 7.8.
C	20+	Sand; dark grey (5Y4/1); calcareous; loose; pH 7.8.

GUELPH SERIES

PARENT MATERIAL: Calcareous loam till.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Guelph.

HORIZON	DEPTH INCHES	DESCRIPTION
A_1 (Ah)	0-4	Loam and silt loam; very dark grey (10YR3/1); fine crumb; friable; pH 7.2.

A_{21} (Ael)	4-10	Loam; dark greyish brown (10YR4/2); medium crumb; friable; pH 6.9.
A_{22} (Ae2)	10-14	Loam; brown (10YR5/3); weak fine platy; friable; pH 7.2.
B_2 (Bt)	14-22	Clay loam; dark brown (10YR4/3); medium sub-angular blocky; friable; pH 7.8.
C	22+	Loam; greyish brown (10YR5/2); compact; hard; pH 8.1.

TABLE 6

ANALYSES OF GUELPH LOAM

Horizon	Depth Inches	Sand %	Silt %	Clay %	pH	Organic Matter %
A_1	0–4	37	50	13	7.2	13.9
A_{21}	4–10	36	49	15	6.9	7.3
A_{22}	10–14	43	43	14	7.2	1.7
Bt	14–22	44	28	28	7.8	2.1
C	22+	48	33	19	8.1	0.9

HONEYWOOD SERIES

Parent Material: Calcareous silty till and alluvial deposits.

Classification: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Honeywood.

Horizon	Depth Inches	Description
A_1 (Ah)	0-4	Silt loam; very dark greyish brown (10YR3/2); fine crumb structure; friable; pH 6.6.
A_{21} (Ael)	4-10	Silt loam; dark brown (10YR4/3); fine granular; friable; pH 6.0.
A_{22} (Ae2)	10-18	Loam; pale brown (10YR6/3); fine granular; friable; pH 6.3.
B_2 (Bt)	18-30	Loam; yellowish brown (10YR5/6); medium sub-angular blocky; friable; pH 6.8.
C	35+	Loam; yellowish brown (10YR7/2); firm; pH 8.0.

HURON SERIES

Parent Material: Calcareous clay and clay loam till.

Classification: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Huron.

Horizon	Depth Inches	Description
A_1 (Ah)	0-4	Clay loam; very dark greyish brown (10YR3/2); fine granular structure; friable; pH 7.1.

A_{21} (Ael)	4-6	Silty clay loam; pale brown (10YR6/3); granular structure; friable; pH 6.5.
A_{22} (Ae2)	6-8	Silty clay loam; light grey (10YR7/2); granular structure; friable; pH 6.5.
B_2 (Bt)	8-26	Clay; dark brown (10YR4/2); coarse blocky; firm; pH 7.5.
	26+	Clay; greyish brown (10YR5/2); hard and moderately compact; pH 7.6.

TABLE 7

ANALYSES OF HURON SILT LOAM

Horizon	Depth Inches	Sand %	Silt %	Clay %	pH	Organic Matter %
Ac (Aa)	0–4	22	50	28	7.1	6.4
A_{21} (Ae1)	4–6	18	45	37	6.5	2.5
A_{22} (Ae2)	6–8	18	48	34	6.5	1.1
B_1 (AB)	8–11	18	42	40	6.1	0.9
B_2 (Bt)	11–26	12	43	43	7.5	0.6
C_1	26+	17	45	38	7.7	0.3

LONDON SERIES

ARENT MATERIAL: Calcareous loam till.

LASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – London.

ORIZON	Depth Inches	Description
(Aa)	0-6	Loam; very dark greyish brown (10YR3/2); fine crumb structure; friable; pH 7.0.
(Aeg)	6-14	Loam; light yellowish brown (10YR6/4); mottled; fine subangular blocky; pH 7.0.
t (Btg)	14-18	Clay loam; dark brown (10YR4/3); mottled; medium subangular blocky; firm; pH 7.4.
	18+	Loam; pale brown (10YR6/3); moderately stony; calcareous; pH 8.3.

MAPLEWOOD SERIES

ARENT MATERIAL: Silty alluvial deposits overlying clay till.

LASSIFICATION: Order – Gleysolic.
Great Group – Dark Grey Gleysolic.
Family – Colwood.

ORIZON	Depth Inches	Description
(Aa)	0-10	Silt loam; very dark grey (10YR3/1); medium granular structure; friable; pH 7.0.

G_1	(Amgl)	10-12	Silt loam; grey (10YR5/1); mottled; medium subangular blocky; friable; pH 6.8.
G_2	(Amg2)	12-30	Silty clay; grey (10YR6/1); strongly mottled; firm; pH 6.8.
D		30+	Clay; greyish brown (10YR5/2); calcareous; compact; pH 7.6.

PARKHILL SERIES

PARENT MATERIAL: Calcareous loam till.
CLASSIFICATION: Order – Gleysolic.
Great Group – Dark Grey Gleysolic.
Family – Lyons.

HORIZON	DEPTH INCHES	DESCRIPTION
A_e (Aa)	0-9	Loam; very dark grey (10YR3/1); fine crumb structure; friable; pH 7.0.
G_1 (Amgl)	9-13	Loam; light grey (2.5Y7/2); mottled; weak fine granular; friable; pH 6.2.
G_2 (Amg2)	13-22	Silt loam; light grey (2.5Y7/2); mottled; medium subangular blocky; firm; pH 6.7.
C	22+	Loam; light brownish grey (2.5Y6/2); calcareous; hard; pH 8.0.

PERTH SERIES

PARENT MATERIAL: Calcareous clay and clay loam till.
CLASSSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Perth.

HORIZON	DEPTH INCHES	DESCRIPTION
A_e (Aa)	0-8	Clay loam; very dark brown (10YR2/2); coarse granular structure; friable; pH 6.7.
A_2 (Aeg)	8-12	Clay loam; greyish brown (10YR5/2); medium subangular blocky; strongly mottled; firm; pH 6.7.
B_2 (Btg)	12-22	Clay; dark brown (10YR4/3); mottled; coarse angular blocky; firm; pH 7.0.
C	22+	Clay; brown (10YR5/3); calcareous, hard and moderately compact; pH 7.6.

TAVISTOCK SERIES

PARENT MATERIAL: Silty alluvial deposits overlying clay till.
CLASSIFICATION: Order – Podzolic.
Great Group – Grey-Brown Podzolic.
Family – Tuscola.

Horizon	Depth Inches	Description
A_e (Aa)	0-5	Silt loam; very dark greyish brown (10YR3/2); fine crumb structure; friable; pH 6.3.
A_2 (Aeg)	5-10	Silt loam; brown (10YR6/4); slightly mottled; weak fine platy; friable; pH 6.3.
B_2 (Btg)	10-20	Silty clay loam; yellowish brown (10YR5/4); mottled; medium subangular blocky; friable; pH 6.5.
D	20+	Clay loam; greyish brown (10YR5/2); calcareous; pH 7.6.

WAUSEON SERIES

Parent Material: Sand overlying calcareous clay till.
Classsification: Order – Gleysolic.
Great Group – Dark Grey Gleysolic.
Family – Granby.

Horizon	Depth Inches	Description
A_1 (Ah)	0-8	Sandy loam; black (10YR2/1); granular; muck like consistency; pH 7.0.
G_1 (Ag1)	8-13	Sandy loam; light brownish grey (2.5Y6/2); strongly mottled; firm; pH 7.2.
G_2 (Ag2)	13-18	Sandy loam; yellowish brown (10YR5/4); very strongly mottled; firm; pH 7.2.
D (II)	18+	Clay; greyish brown (10YR5/2); calcareous; pH 7.8.

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